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**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA
OAKLAND DIVISION**

IN RE DYNAMIC RANDOM ACCESS
MEMORY (DRAM) DIRECT PURCHASER
ANTITRUST LITIGATION

THIS DOCUMENT RELATES TO:

ALL DIRECT PURCHASER ACTIONS

Case No. 4:18-cv-03805

**CONSOLIDATED AMENDED
COMPLAINT
CLASS ACTION**

DEMAND FOR JURY TRIAL

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I. INTRODUCTION

1 1. This action is brought as a class action on behalf of a plaintiff class consisting of all
2 persons and entities in the United States that purchased Dynamic Random Access Memory
3 (“DRAM”) directly from the named defendants during the period from approximately June 1, 2016
4 through at least February 2018 (“Class Period”).

5
6 2. DRAM is high density, low-cost-per-bit, random access memory components that
7 store digital information and provide high-speed storage and retrieval of data. DRAM is used in
8 products, such as personal computers, servers, laptops, tablets, televisions, printers, cameras, and
9 cellphones, and in industrial applications, such as automotive, military, and aviation devices.
10 DRAM is used as a storage module to hold data as it is processed. DRAM is sold in individual
11 chips or as modules with several chips attached to the module.

12 3. Defendants are the leading manufacturers of DRAM, with a combined worldwide
13 market share of approximately 95%.

14 4. As alleged in detail in this Complaint, this is a classic case of manufacturers in
15 control of a commodity product—with little to no price elasticity—agreeing to fix prices,
16 coordinate their conduct, limit their production and slow their capacity to increase prices. Prior to
17 and during the Class Period, Defendants agreed to fix prices, delay or slow capacity, or not to
18 expand capacity at all. Defendants’ conduct was a marked departure from their conduct before they
19 began colluding and, as Defendants intended, it stopped DRAM prices from falling and caused
20 prices to increase dramatically.

21 5. Defendants conducted much of their conspiratorial activity by hiding in plain sight;
22 announcing, committing to, and repeatedly reaffirming their common scheme of price inflation
23 reinforced methods such as coordinated supply restrictions in countless public-facing
24 communications to investors and at presentations at industry conferences. Through these means
25 and others, Defendants conveyed to each other highly specific information about their future
26 production plans of a type competing companies in a well-functioning competitive marketplace
27 would ordinarily conceal from one another and keep closely confidential as the most sensitive type
28 of strategic competitive business information. Defendants were further able to confirm their

ongoing commitment and verify each other's compliance through an array of informal contacts at industry events and a sustained program of sophisticated information sharing carried out by nominally independent reporting entities that Defendants alone funded and controlled. And a confidential witness has furthermore confirmed instances where a Defendant strategically leaked internal information about its production plans with the intention and awareness that the information would be conveyed to the other conspirators. Economists have long recognized that public communications can constitute explicit collusion among competitors, without the need for secret discussions in the proverbial smoke-filled room.¹

6. The economic evidence likewise strongly suggests that Defendants acted against their own self-interest and in a coordinated, collusive manner. Defendants collectively control approximately 95% of the DRAM market. When presented with an opportunity to capture market share from competitors, however, Defendants failed (or refused) to do so. For example, the Samsung Defendants restricted DRAM production in 2016 despite acknowledging they “expect[ed] demand to increase” in a second quarter earnings report. Had the Samsung Defendants continued DRAM production at levels consistent with previous periods, they would have earned higher total profits. Instead, the Samsung Defendants decreased DRAM production, thereby taking action that would be contrary to their own self-interest absent collusion. Similarly, the SK Hynix and Micron Defendants decreased DRAM production despite rising demand in the market. Economic data shows that overall DRAM production levels stagnated even while DRAM prices soared, indicating that DRAM producers were not meeting market demand despite having the ability to do so. Had any Defendant increased production in response to rising demand, it could have achieved additional market share or greater profits and put greater pressure on their competitors. Instead, all Defendants fell in line with their shared illicit scheme, and restricted production on a coordinated basis.

¹ See e.g. Y. Awaya and V. Krishna, “On Communication and Collusion,” American Economic Review 2016, 106(2), 285-315, available at http://www.sas.rochester.edu/eco/people/faculty/awaya_yu/assets/pdf/On%20communication%20and%20collusion.pdf (last accessed January 11, 2021); G. Aryal, F. Ciliberto, and B.T. Leyden, “Public Communication and Collusion in the Airline Industry,” U. Chicago Becker Friedman Institute Working Paper No. 2018-11, available at https://bfi.uchicago.edu/wp-content/uploads/WP_No.2018-11.pdf (last accessed January 11, 2021).

1 7. Plaintiffs allege that before and during the Class Period, Defendants conspired,
2 combined, and contracted to fix, raise, maintain, and stabilize the prices at which DRAM was sold
3 in the United States. As a result of Defendants' conduct, Plaintiffs and the other members of the
4 Class paid artificially inflated prices for DRAM during the Class Period. Such prices exceeded the
5 amount they would have paid if the price for DRAM had been determined by a competitive
6 market.

7 **II. JURISDICTION AND VENUE**

8 8. Plaintiffs bring this action under §§ 4, 12, and 16 of the Clayton Act (15 U.S.C. §§
9 15, 22, and 26) for treble damages, injunctive relief, and reasonable attorneys' fees and costs with
10 respect to the injuries sustained by Plaintiffs arising from violations by Defendants of the federal
11 antitrust laws, including Section 1 of the Sherman Antitrust Act (15 U.S.C. § 1).

12 9. This Court has jurisdiction over this action pursuant to 28 U.S.C. §§ 1331, 1337(a)
13 and 1367.

14 10. This Court has *in personam* jurisdiction over each of the Defendants because each
15 Defendant, either directly or through the ownership or control of its United States subsidiaries,
16 *inter alia*: (a) transacted business in the United States, including in this District; (b) directly or
17 indirectly sold or marketed substantial quantities of DRAM throughout the United States,
18 including in this District; (c) had substantial aggregate contacts with the United States as a whole,
19 including in this District; or (d) were engaged in an illegal price-fixing conspiracy that was
20 directed at, and had a direct, substantial, reasonably foreseeable and intended effect of causing
21 injury to, the business or property of persons and entities residing in, located in, or doing business
22 throughout the United States, including in this District. Defendants also conduct business
23 throughout the United States, including in this District, and they have purposefully availed
24 themselves of the laws of the United States.

25 11. Venue is proper in this District pursuant to 15 U.S.C. §§ 15 and 22, and 28 U.S.C. §
26 1391(b) and (c), in that at least one of the Defendants resides in this judicial district, is licensed to
27 do business, or is doing business in this judicial district.

1 **III. THE PARTIES**

2 **A. Plaintiffs**

3 12. Plaintiff John Treanor is a resident of Los Angeles, California. During the Class
4 Period, Plaintiff purchased DRAM directly from one of the Defendants and/or their subsidiaries
5 and suffered injury as a result of Defendants' unlawful conduct. As a result of the conspiracy
6 alleged herein, Plaintiff has been injured in his business or property in that the price he paid for
7 DRAM was artificially raised, maintained, or stabilized at a supra-competitive level by Defendants
8 and their co-conspirators.

9 13. Plaintiff onShore Networks of Illinois, L.L.C. (d/b/a onShore Networks, L.L.C.) is
10 an Illinois corporation with its principal place of business in Chicago, Illinois. During the Class
11 Period, Plaintiff purchased DRAM directly from one of the Defendants and/or their subsidiaries
12 and suffered injury as a result of Defendants' unlawful conduct. As a result of the conspiracy
13 alleged herein, Plaintiff has been injured in its business or property in that the price it paid for
14 DRAM was artificially raised, maintained, or stabilized at a supra-competitive level by Defendants
15 and co-conspirators.

16 **B. Defendants**

17 **1. The Micron Defendants**

18 14. Defendant Micron Technology, Inc. ("Micron Technology") is a Delaware
19 corporation with its principal place of business at 8000 South Federal Way, Boise, Idaho 83716.
20 Micron Technology is a foreign stock corporation registered with the California Secretary of State
21 and authorized to transact intrastate business in California. During the Class Period, Micron
22 Technology manufactured, sold, and distributed DRAM throughout the United States.

23 15. Defendant Micron Semiconductor Products, Inc. ("Micron Semiconductor") is an
24 Idaho corporation located at 8000 South Federal Way, Boise, Idaho 83716. Micron Semiconductor
25 is a foreign stock corporation registered with the California Secretary of State and authorized to
26 transact intrastate business in California. Micron Semiconductor is a wholly owned and controlled
27 subsidiary of Micron Technology. During the Class Period, Micron Semiconductor sold and
28 distributed DRAM to customers throughout the United States.

1 16. Defendant Micron Consumer Products Group, Inc. (“Micron Consumer”) is a
 2 Delaware corporation located at 8000 South Federal Way, Boise, Idaho 83716. Micron Consumer
 3 is a foreign stock corporation registered with the California Secretary of State and authorized to
 4 transact intrastate business in California. Micron Consumer is a wholly owned and controlled
 5 subsidiary of Micron Technology. During the Class Period, Micron Consumer sold and distributed
 6 DRAM to customers throughout the United States. Micron Consumer is the “consumer-facing
 7 entity of Micron Technology.” The Micron Consumer name brought several entities—Lexar
 8 Media, Inc. (U.S.), Crucial Technology (U.S.), Lexar Media (EMEA region), Lexar Media
 9 (APAC region), and Lexar Media (Japan) under one name as of July 17, 2012. Micron Consumer
 10 sells, among other things, Crucial-branded DRAM in the U.S. via www.crucial.com. Crucial is a
 11 Micron Technology brand.

12 17. Defendants Micron Technology, Micron Semiconductor, and Micron Consumer are
 13 collectively referred to herein as “Micron.”

14 **2. The Samsung Defendants**

15 18. Defendant Samsung Electronics Co., Ltd. (“SEC”) is a Korean corporation and
 16 maintains its executive offices at 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea.
 17 During the Class Period, SEC manufactured, sold, and distributed DRAM throughout the world,
 18 including the United States.

19 19. Defendant Samsung Semiconductor, Inc. (“SSI”) is a California corporation located
 20 at 3655 North First Street, San Jose, California 95134. SSI is a wholly owned “multi-billion dollar
 21 subsidiary” of SEC. During the Class Period, SSI sold and distributed DRAM throughout the
 22 United States.

23 20. Defendants SEC and SSI are collectively referred to herein as “Samsung.”

24 **3. The SK Hynix Defendants**

25 21. Defendant SK Hynix, Inc. (f/k/a Hynix Semiconductor, Inc.) (“SK Hynix Korea”)
 26 maintains its head offices at 2091, Gyeongchung-daero, Bupal-eub, Icheon-si, Gyeonggi-do,
 27 Korea. SK Hynix Korea “is the second-largest memory chip manufacturer in the world, leading the
 28 global memory semiconductor market and the sixth-largest company in the semiconductor field.”

1 SK Hynix Korea’s “main products are DRAM and NAND flash.” During the Class Period, SK
2 Hynix Korea manufactured, sold, and distributed DRAM throughout the world, including the
3 United States.

4 22. Defendant SK Hynix America, Inc. (f/k/a Hynix Semiconductor America, Inc.)
5 (“SK Hynix America”) is a California corporation located at 3101 North First Street, San Jose,
6 California 95134. SK Hynix America is a wholly owned and controlled subsidiary of SK Hynix
7 Korea. During the Class Period, SK Hynix America sold and distributed DRAM throughout the
8 United States.

9 23. Defendant SK Hynix Korea and SK Hynix America are collectively referred to
10 herein as “SK Hynix.”

11 24. Micron, Samsung, and SK Hynix are collectively referred to herein as
12 “Defendants.”

13 **IV. AGENTS AND CO-CONSPIRATORS**

14 25. Various other individuals, partnerships, corporations, and other business entities,
15 unknown to the Plaintiffs, have participated in the violations alleged herein and have performed
16 acts and made statements in furtherance thereof. Plaintiffs reserve the right to name some or all
17 these persons as defendants later.

18 26. The acts charged in this complaint have been done by Defendants or were ordered
19 or done by Defendants’ officers, agents, employees, or representatives, while actively engaged in
20 the management of Defendants’ affairs.

21 27. Whenever in this complaint reference is made to any act, deed, or transaction of any
22 corporation, the allegation means that the corporation engaged in the act, deed or transaction by or
23 through its officers, directors, agents, employees or representatives while they were actively
24 engaged in the management, direction, control or transaction of the corporation’s business or
25 affairs.

26 28. Each Defendant or co-conspirator acted as the principal, agent, or joint venture of,
27 or for, other Defendants and co-conspirators with respect to the acts, violations, and common
28

1 course of conduct alleged by Plaintiffs. Each Defendant and co-conspirator that is a subsidiary of a
 2 foreign parent acts as the United States agent for DRAM made by its parent company.

3 **V. CLASS ACTION ALLEGATIONS**

4 29. Plaintiffs bring this action both on behalf of himself and as a class action pursuant
 5 to Federal Rules of Civil Procedure 23(a) and (b)(3), on behalf of the following class:

6 All individuals and entities that, during the period from June 1, 2016 through at
 7 least February 2018, purchased DRAM in the United States directly from one or
 8 more of the Defendants, their subsidiaries, or their affiliates. Excluded from the
 Class are Defendants and their parents, subsidiaries, affiliates, all governmental
 entities, and co-conspirators.

9 30. Plaintiffs do not know the exact number of class members because such information
 10 is in the exclusive control of Defendants. Plaintiffs believe that, due to the nature of the trade and
 11 commerce involved, there are likely thousands of class members, geographically dispersed
 12 throughout the United States such that joinder of all class members is impracticable.

13 31. Plaintiffs' claims are typical of the claims of the class in that Plaintiffs are direct
 14 purchasers of DRAM, all class members were damaged by the same wrongful conduct of
 15 Defendants and their coconspirators as alleged herein, and the relief sought is common to the class.

16 32. Numerous questions of law or fact arise from Defendants' anticompetitive conduct
 17 that are common to the class. Among the questions of law or fact common to the class are:

- 18 a. Whether Defendants engaged in a contract, combination or conspiracy
 19 among themselves to fix, maintain, or stabilize the prices for DRAM sold in
 20 the United States;
- 21 b. Whether Defendants engaged in a contract, combination, or conspiracy to
 22 restrict output of DRAM sold in the United States;
- 23 c. Whether Defendants restricted output of DRAM sold in the United States
 24 and committed other conduct in furtherance of the alleged conspiracy;
- 25 d. Whether the conduct of Defendants caused prices of DRAM sold in the
 26 United States to be artificially inflated to non-competitive levels; and

1 e. Whether Plaintiffs and other members of the class were injured by the
2 conduct of Defendants and, if so, the appropriate class-wide measure of
3 damages and appropriate injunctive relief.

4 33. These questions of law or fact are common to the class and predominate over any
5 other questions affecting only individual class members.

6 34. Plaintiffs will fairly and adequately represent the interests of the class in that
7 Plaintiffs are direct purchasers of DRAM from at least one Defendant and have no conflicts with
8 any other member of the class. Furthermore, Plaintiffs have retained competent counsel
9 experienced in antitrust and class action litigation.

10 35. A class action is superior to the alternatives, if any, for the fair and efficient
11 adjudication of this controversy.

12 36. Prosecution of separate actions by individual class members would create the risk
13 of inconsistent or varying adjudications, establishing incompatible standards of conduct for the
14 Defendants.

15 37. Injunctive relief is appropriate as to the class because Defendants have acted or
16 refused to act on grounds generally applicable to the class.

17 38. Plaintiffs reserve the right to expand, modify, or alter the class definition in
18 response to information learned during discovery.

19 **VI. TRADE AND COMMERCE**

20 39. During the Class Period, Defendants, or one or more of their subsidiaries, sold and
21 shipped substantial quantities of DRAM in the United States in a continuous and uninterrupted
22 flow of interstate and international commerce to customers, including through and into this judicial
23 district.

24 40. The business activities of Defendants that are the subject of this complaint were
25 within the flow of, and substantially affected, interstate trade and commerce in the United States
26 and caused antitrust injury in the United States.

27 41. During the Class Period, Defendants collectively controlled most of the market—
28 approximately 95%—for DRAM, both globally and in the United States.

VII. STATEMENT OF FACTS

A. What is DRAM?

42. DRAM is one of the most common forms of semiconductor memory, a vital component in modern digital electronics. Composed of silicon wafers, DRAM are high density, low-cost-per-bit, random access memory components that store digital information and provide high-speed storage and retrieval of data used in personal computers and servers, laptops, tablets, televisions, printers, cameras, cellphones, and in industrial applications, such as automotive, military, and aviation devices. DRAM is used as a storage module to hold data as it is processed. DRAM is sold in individual chips or as modules with several chips attached to the module.

43. DRAM stores each “bit” of data in a separate capacitor within an integrated circuit. The “bit” is the basic unit of information stored in DRAM. A key attribute of a DRAM chip is its density—the amount of information it can store in the tiny circuits etched into its silicon surface. This attribute makes it very attractive for use in digital electronics and in industrial applications.

44. “RAM” or “Random Access Memory” is the information storage or memory in a computer that stores running programs and data for the programs. Data (information) in the RAM can be read and written quickly in any order. Normally, the RAM is in the form of computer chips, such as DRAM.

45. Each capacitor on a DRAM chip can be either charged or discharged; these two states are taken to represent the two values of a bit, conventionally called 0 and 1. Since even “non-conducting” transistors always leak a small amount, the DRAM capacitors will slowly discharge, and the information eventually fades unless the capacitor charge is refreshed periodically. Because of this refresh requirement, it is a dynamic random-access memory as opposed to static random-access memory (SRAM) and other static types of memory. Unlike flash memory, DRAM is volatile memory (versus non-volatile memory) since it loses its data quickly when power is removed. However, DRAM does exhibit limited data remanence.

B. DRAM Industry: Background

46. The DRAM industry is a multi-billion-dollar industry. The DRAM market grew to \$73 billion in revenue in 2017, a growth rate of 77%. In the first quarter of 2018, Samsung

1 achieved revenue of a record-high \$10.36 billion from global DRAM sales. Defendants are the
2 world's largest manufacturers of DRAM.

3 47. The DRAM market is highly concentrated, with just three companies dominating
4 the industry. Defendants Samsung, Micron, and SK Hynix grew their combined market share from
5 "just under 60% in 2007 to 95% in Q2 [of] 2017."

6 48. Defendants control the DRAM supply globally and their customers require a certain
7 amount of DRAM for their products to work, thus DRAM is a "sellers' market." "Device
8 manufacturers need a certain amount of DRAM to meet performance requirements for systems that
9 they may have worked on developing several quarters ago. This forces companies to buy DRAM
10 irrespective of higher prices, without being able to meaningfully scale back."

11 49. DRAM is a commodity. Price quotes should depend primarily on supply and
12 demand for the most part rather than on technological advantages. Like other electronic product
13 markets that have been the subject of antitrust investigations (*e.g.*, Cathode Ray Tubes, Lithium
14 Ion Batteries, and Capacitors), the DRAM market has characteristics that make it susceptible to
15 collusion, including: (a) a concentrated market dominated primarily by a few companies (here, the
16 three Defendants control approximately 95% of the market); (b) significant barriers to entry; (c)
17 inelastic downstream demand (for products made with the products at issue); (d) standardization or
18 commoditization of products; (e) avenues that allow the Defendants to exchange or signal
19 competitive information; and (f) pricing behavior that is inconsistent with a competitive market.

20 50. For example, Defendants had many chances to collude through common
21 participation in trade associations and industry groups, and through their overlapping business
22 relationships. Defendants also had the means to monitor each other's compliance with agreements
23 not to compete, through DRAMeXchange—a research unit of TrendForce, a market intelligence
24 provider, and an authoritative source for DRAM-related data oft-cited and widely-relied upon by
25 industry analysts and participants. DRAMeXchange provides subscribers with up to date (monthly,
26 in some cases daily) information about defendants' capital expenditure capacity by specific brand
27 and plant, output by specific brand, plant, and type of DRAM, production process and technology
28 utilized, supply-demand sufficiency, and spot and contract prices. This is precisely the type of

1 information conspirators require to collude. Defendants all subscribed to and participated in
2 DRAMeXchange.

3 51. The DRAM market also has substantial barriers to entry. As noted by Micron CFO
4 Ernie Maddock, “[T]here are extremely significant intellectual property hurdles and knowledge
5 hurdles” to participate in the market. To overcome these obstacles, Maddock notes that companies
6 like “Samsung, Hynix, and Micron . . . each . . . has hundreds and thousands of people years
7 invested in the knowledge and IP necessary to do what [they] do.” Maddock further admits that he
8 does not “think that that knowledge can be replicated very easily at all and as a result there will be
9 some challenge for China to organically enter the DRAM market.”

10 52. Maddock’s perception of the DRAM market is shared by others in the industry as
11 well. Samsung stated on its first quarter earnings call on April 26, 2017 that:

12 [T]he memory market itself has evolved during the past and . . . it is now
13 protected by quite a high barrier to entry because (sic) memory business today
14 requires not only a very cutting-edge processes migrated, but also needs to have
various high value-add solutions to go with the products.

15 53. The DRAM market is also characterized as inelastic by those in it. In describing the
16 DRAM market, Maddock said:

17 I think there is a general belief that the industry participants are keenly aware of
18 the fact that the DRAM market is relatively inelastic and the way you serve that
market is by making sure there is adequate, but not excess supply.

19 **C. Defendants’ Pre-Class Period Conduct**

20 54. In the years prior to the Class Period, Defendants competed with one another for
21 market share through independent, competitive decisions regarding supply and capacity, which led
22 to declining DRAM prices.

23 55. For example, on Samsung’s second quarter earnings call on July 31, 2014, Samsung
24 noted its expectation for its bit growth to be higher than the industry:

25 For DRAM our bit growth in second quarter was approximately 20% q-on-q and
26 we expect for the third quarter the market DRAM bit growth will come in at high
27 single digit and we will outgrow the market’s bit growth. At this point we expect
the DRAM market bit growth for 2014 to be low 30%s and we expect our bit
28 growth for the year to be high 40%s. The second quarter we experienced ASP
decline of DRAM at low single digit.

1 Samsung noted that “while the market demand remains strong, the suppliers weren’t able to bring
2 on additional supply much more other than us, and therefore we were in a very good position to
3 capture this opportunity. That is resulting in the higher bit growth expectations that you have
4 heard.”

5 56. On its third quarter earnings call in October 30, 2014, Samsung stated its policy
6 “that our bit growth rate next year should or would have to be higher than the industry. That is our
7 goal.” Samsung also noted in response to investor questions that “if we see the price to be very
8 attractive, then we can use the idle capacity to increase our work in progress, which has helped us
9 this year.”

10 57. Again, on Samsung’s fourth quarter earnings call on January 29, 2015, Samsung
11 discussed its plans to exceed market growth:

12 For DRAM business in Q4, our bit growth was flat from Q3 as well as ASP which
13 was also flat. For the first quarter 2015 for DRAM bit growth, we expect both
14 market and Samsung Electronics to be flat from Q4. We are expecting about mid
20% bit growth for market growth for DRAM and our bit growth we believe will
outgrow that of the market growth.

15 58. On the earnings call, Samsung noted that:

16
17 [A] shortage in the industry would be great news. I don’t think a shortage will
18 happen overnight. We will have signs to indicate a shortage coming forward, and
19 so if we do see such signs such as the economy picking up or orders for other
20 components picking up, I am sure – looking at all of the resources that we have,
not only in our side but also in the overall semiconductor side, personally I think
that we will find a way of capturing any shortage opportunities if they do
materialize.

21 Thus, Samsung reiterated its plans to “outgrow the industry,” *i.e.*, to expand production
22 aggressively and at a pace more rapid than its competitors could match: “the main reason why we
23 are planning and expecting to outgrow the industry is because we have better productivity
24 compared to our competitors based on our technology leadership in terms of the manufacturing.
25 That is the main reason why we’re expecting to outgrow the industry.” Samsung further noted that
26 “the reason why last year and the year before the situation on the DRAM side was so favorable for
27 us was mainly caused from the supply side rather than the demand side.” Revenues had increased
28 not due to higher prices but because Samsung had produced and sold more DRAM.

59. DRAmEXchange reported that DRAM prices declined from October 2014 to June 2016, with “the average contract price of DDR3 4GB plunging 62% from US\$32.75 to US\$12.5.”

D. From 2015, Micron Made Public Comments, Calling for Supply Restrictions

60. From 2015, Micron engaged in many public exhortations, inviting its competitors to stop adding capacity. Samsung and SK Hynix responded to these exhortations.

61. For example, on Micron Technology’s first quarter earnings call on January 6, 2015, Mark Durcan, Micron’s then-CEO, stated that Micron expected “continued favorable market conditions for 2015 led by constrained supply in DRAM.” Durcan further indicated that Micron expected “industry bit growth in the low to mid 20% range in 2015 with the development of advanced process technology proving to be disruptive to wafer production.” Durcan concluded by sharing Micron’s belief that “even with steps taken to address the otherwise declining gross wafer production in DRAM the net wafer output in the industry will stay relatively steady or decline slightly going forward leading to a relative stability of bit supply growth even beyond 2015.”

62. On Micron’s second quarter earnings call on April 1, 2015, Durcan made similar comments, stating, “[f]or 2016 . . . we expect to be in line with or slightly above the industry bit growth.” Durcan went on to say that the DRAM industry is “a more rational industry and with that is coming better behavior” and that Micron would “do the right things to run our business,” including, “not selling inventory below acceptable prices.” Plaintiffs contend that Mr. Durcan’s comments regarding “better behavior” were intended to announce to Micron’s competitors a standard they were expected to meet, and constituted an invitation to enter into a collusive scheme whereby the Defendants would maintain their respective market shares and slow output growth to enable all suppliers to extract higher prices from their customers, including Plaintiffs.

63. During this same second quarter earnings call, Mark Adams, Micron’s then-President and interim CFO, also signaled movements in Micron’s capacity, stating, “[a]lthough these manufacturing moves generally weigh on production bit output guidance, our DRAM process transitions will more than make up for the bit or wafer effect. As a result, we are guiding to high single digit sequential output growth for each of the next couple of quarters.”

1 64. On Micron's third quarter earnings call on June 25, 2015, Durcan described overall
2 DRAM market conditions, saying Micron expected "stabilizing ASPs across the broader market
3 over time." He further explained that "[c]onsistent with prior expectations, we are forecasting
4 DRAM industry supply bit growth in the mid-20s in calendar 2015 and in the low to mid 20% in
5 calendar 2016."

6 65. Then on Samsung's second quarter earnings call on July 30, 2015, Samsung
7 changed course and first indicated its willingness—and commitment—to abide by Micron's public
8 invitation to limit capacity, stating:

9 For us it's always been an issue of profitability. Profitability is the top priority of
10 the business that we operate, rather than competing over market share. I feel that
11 it's inappropriate for us to directly mention or comment about production or
12 growth of a specific company, but what we can say is that if you look at this year,
even the bit growth overall, including ourselves, was less than what was expected
up until now.

13 66. On Micron's fourth quarter earnings call on October 1, 2015, Durcan reiterated
14 Micron's expectation that "industry supply and demand for both DRAM and NAND to be
15 relatively balanced in 2016."

16 67. At the UBS Global Technology Conference on November 17, 2015, Micron CFO
17 Ernie Maddock observed that Micron was in "an environment where you have closely held
18 technology by a very limited number of producers." Maddock further noted that "you're seeing
19 some really rational decisions" and that "we don't foresee a reason that there would be any
20 significant DRAM capacity expansion." Plaintiffs contend that these statements were intended to
21 reach Micron's competitors, Defendants Samsung and SK Hynix, and that Micron's message that
22 there existed no reason for any significant DRAM capacity expansion was readily understood.

23 68. Similarly, on Micron's first quarter 2016 earnings call on December 22, 2015, Mark
24 Durcan noted that "[t]he DRAM industry consist[s] of only three technology developers, based on
25 current long-term outlook we foresee technology driven supply growth slowing and can envision a
26 future in which no additional DRAM wafer capacity is required." Micron estimated that "industry
27 bit supply growth will be in a low 20% range in 2016, in line with demand and that industry
28 fundamentals will remain healthy over the long-term."

69. In early 2016, DRAM prices were still falling with Micron reporting a “30% decline in revenue [] paired with a quarterly loss.” Reports noted “Micron’s financial performance going forward is going to depend heavily on DRAM pricing, and it will take a stabilization of prices before Micron is able to return to earnings growth. *Unfortunately for the company, there’s not much reason to believe that DRAM prices will improve anytime soon.*” (emphasis added). Analysts noted Samsung’s past “aggressive behavior,” with its focus on expanding its market share in DRAM. One commentator even noted that Samsung may be “the sole survivor in DRAM” as a result of its competitive behavior.

70. On Micron’s second quarter earnings call on March 30, 2016, when questioned about the likelihood of the company cutting production to restrict supply, Micron’s then-CEO Mark Durcan stated “we think we would be foolish to be the first ones to take capacity off,” while Micron CFO Ernie Maddock stated “it’s a really ill-advised move to be *unilaterally* cutting production.” (emphasis added). Both statements served as a further invitation to Micron’s competitors to enter a scheme of coordination. Mr. Durcan also signaled that Micron would not try to take market share from its competitors: “Our focus isn’t on market share. Our focus is on making sure that we’ve deployed equivalent advanced technology, at least equivalent advanced technology to our competitor, so that we’re not incentivizing others to play for market share.”

71. SK Hynix reported a 17% fall in revenue from the previous quarter in March 2016. While analysts suggested that Samsung appeared to be engaging in a competitive price war, SK Hynix announced its plans for “a below-industry growth rate while protecting its unit sales prices,” as strong statement of willingness to enter and endorsement and ratification of the scheme Micron had proposed.

E. In 2016, Defendants Changed Their Behavior and Responded to Micron’s Invitations to Restrict Supply

72. Within a month of Micron’s statements, Samsung announced at its first quarter earnings call on April 28, 2016 that “[f]or DRAM business in Q1 this year, our bit growth was negative low single digit with low teens of ASP decline.” In response to investor questions, Samsung noted: “We don’t expect there to be major increases in supply of DRAM in the near

1 future. . . . And we will in terms of full year 2016 DRAM shipment we expect to be in line with the
2 market growth.”

3 73. Meanwhile, a Samsung executive in South Korea engaged outside help to ensure its
4 message about highly sensitive, confidential information was conveyed to Micron and SK Hynix
5 in a manner that would bear the imprimatur of reliability. A confidential witness who is a former
6 Samsung executive who worked on Samsung memory and officed at Samsung North America’s
7 San Jose, California headquarters (in this District) during the conspiracy has come forward, and
8 described certain conversations he had with Pablo Temprano, another Samsung executive in the
9 United States. In early 2016, Sewon Chun, a Samsung executive vice president for Memory
10 Marketing with authority over pricing and production for Samsung DRAM, advised Mr. Temprano
11 to leak the information that Samsung was raising prices on DRAM to Cleveland Research industry
12 analyst Sean Muir. As of early 2016, Mr. Muir published a regular monthly industry report known
13 to be closely monitored by the Defendants. Although he was reluctant to do so, Mr. Temprano
14 eventually leaked the price increase information to Mr. Muir. This confidential witness attests that
15 Samsung leaked this information to reassure Micron and SK Hynix that they could safely raise
16 prices as well, without fear that Samsung would undercut them on price, as Samsung might have
17 done if it intended to compete in the non-collusive manner of boosting production to chase greater
18 market share.

19 74. SK Hynix seemingly responded to Micron’s invitation as well. Despite fear from
20 industry analysts that SK Hynix would be hurt by a competitive price war with Samsung, *Barron’s*
21 reported that “Hynix does not seem to be striking back.”²

22 75. At the JP Morgan Global Technology, Media and Telecom Conference on May 25,
23 2016, Durcan noted that “bit growth next year will be 20%-ish” “as long as nobody adds any
24 incremental DRAM wafers,” and “[i]f wafers actually come down as we’re starting to hear some
25 equipment suppliers talk about, then it could be mid- to high-teens, in which case that would be
26 more beneficial.” Durcan noted that, in 2014, Samsung “added some wafers probably more than

27
28 ² Shuli Ren, *SK Hynix Sees Quick Rebound In Q2, No Price War In DRAM, NAND*, Barron’s
(October 25, 2019, 4:18 PM), <https://www.barrons.com/articles/sk-hynix-sees-quick-rebound-in-q2-no-price-war-in-dram-nand-1461638470>.

1 they in retrospect would have . . . I don't think the intention was to oversupply the market. But
 2 following that, we had a fairly significant decline over the last couple of years[.]” When asked if
 3 Micron and its competitors were being disciplined regarding the DRAM segment of the market,
 4 Durcan continued, “[W]e all are going to either benefit or be hurt by excess supply in the
 5 marketplace.” Durcan stated that he expected Defendants to maintain discipline regarding bit
 6 growth: “there’s a natural tightening tendency absent, somebody wanting to do something different
 7 than that. And so I’m – I actually remain bullish on the long term value, the DRAM business and
 8 the actions of the competitors in the marketplace.”

9 76. On May 26, 2016, the World Semiconductor Council’s 20th Anniversary Meeting
 10 took place in Seoul, South Korea. Park Sung-wook, CEO of SK Hynix, was one of six chairmen of
 11 the World Semiconductor Council. The meeting was attended by representatives from China,
 12 Taiwan, the EU, Japan, the U.S., and Korea. Samsung Electronics was one of those in attendance,
 13 with one Samsung attendee quoted in media reports following the meeting. Just days before the
 14 start of the Class Period, representatives of at least two Defendants had a clear opportunity to
 15 communicate directly. Defendants are also all members of the United States’ Semiconductor
 16 Industry Association, which appoints delegates as members of the World Semiconductor Council.

17 **F. Defendants’ Agreement to Restrict DRAM Supply Led to Rising DRAM**
 18 **Prices**

19 77. As alleged in detail below, prior to and during the Class Period, Defendants agreed
 20 to delay or slow capacity, or not to expand capacity at all. This coordination aided Defendants’
 21 efforts to stop DRAM prices from falling and caused prices to dramatically reverse course. One
 22 method Defendants used to effectuate their agreement was to communicate their shared intentions
 23 to limit DRAM capacity through public statements, and each taking the agreed upon actions in
 24 response.

25 78. Defendants made statements in earnings calls, press releases, media, or other public
 26 documents and monitored each other’s plans.

1 79. Defendants’ statements about capacity discipline, limiting production or supply, not
2 increasing supply/capacity, slowing growth in capacity or supply, etc. represented a deviation from
3 past business practices.

4 80. By reassuring each other through these communications, Defendants demonstrated
5 each was committed to their common scheme of maintaining capacity and supply discipline to
6 restrict output during steady increases in demand and rising prices – unlike in 2014, and contrary
7 to their individual interest in increasing market share and short-term profits.

8 81. In fact, Defendants’ conspiratorial conduct was extremely effective in causing
9 DRAM prices to climb sharply from the middle of 2016 to the present. During this period, DRAM
10 spot prices rose approximately 350%—an increase totally unique compared to DRAM’s prior
11 pricing history. Defendants, as a result, reaped huge profits during the Class Period.

12 82. Defendants’ illegal and anticompetitive behavior, alleged herein, artificially
13 stabilized and raised the prices of DRAM during the Class Period. As a result, DRAM prices were
14 higher than they would have been absent the conspiracy.

15 83. After several public statements by Micron regarding the need to limit capacity, in
16 2016, Samsung acceded to Micron’s invitations and abruptly changed its behavior. Rather than
17 aggressively pursuing market share, Samsung changed focus. On January 29, 2016, Samsung, at its
18 fourth quarter 2015 earnings call forecasted growth in line with the market for the coming year:
19 “For 2016, for the whole year, the DRAM market bit growth, we expect mid-20%, and our bit
20 growth is expected to grow align with the market.” Samsung also announced its plans to move
21 away from its aggressive market share approach to focus “on maintaining our market leadership
22 rather than own growth and continue to expand the sales of high value-added and differentiated
23 products,” thereby confirming for Micron and SK Hynix that they could increase prices without
24 fear of Samsung undercutting them to claim market share.

25 84. On June 16, 2016, Micron’s CFO Ernie Maddock reassured the market—in
26 response to a question about Samsung’s “disruptive” behavior—that “this idea that there is a
27 general reduction in DRAM CapEx planned by our Korean competitors and that we believe is very
28 consistent with other messages that we’re hearing in the marketplace. So am I concerned? We’re

1 always concerned. Do we believe that that disruptive behavior is a high likelihood? It just doesn't
2 feel as if that's the case right now." Plaintiffs contend that Mr. Maddock's comments, which
3 constituted forward looking statements materially relevant to his company's performance to an
4 audience including many current and potential investors, were based not just on feelings but also
5 Defendants' mutual assurances.

6 85. From June 2016 onwards, DRAM prices increased, yet each Defendant limited bit
7 growth by not adding significant wafer capacity and consistently communicated their plans to
8 grow in line with the market rather than pursuing market share so that slowly expanding market
9 supply would continue to lag and would never fully catch up with market demand. This knowingly
10 coordinated behavior generated consistent anticompetitive overcharges and enabled each of the
11 three competitors to enjoy its respective share of these illicit monopoly profits.

12 86. On Micron's June 30, 2016 third quarter earnings call, Mark Durcan stated "[i]n
13 light of current market conditions, we have no plans to add DRAM wafer capacity."

14 87. On SK Hynix's July 21, 2016 second quarter earnings call, SK Hynix stated,
15 "DRAM bit shipment growth is expected to be in the high single digit in the third quarter, which
16 will make the shipment growth for the year to be low to mid 20%, in line with market growth."

17 88. Just seven days later, at its July 28, 2016 earnings call, Samsung reiterated its plan
18 to grow in line with the market, predicting very similar growth to SK Hynix: "For the third quarter,
19 we expect the DRAM market bit growth to be mid-teens and we will grow along with the market.
20 And at this point, we expect 2016 DRAM market bit growth to be mid-20%, and we will grow in
21 line with the market."

22 89. Industry analysts noted "a sudden market upturn began in the second half of" 2016.
23 "To a large extent, the chip market is booming more than expected thanks to a sustained surge in
24 memory chip pricing driven by tight supply. IC Insights said the DRAM market is now expected to
25 grow by 55 percent this year, while the market for NAND flash is now expected to grow by 35
26 percent. In both cases, the sales increases are being driven almost entirely by price increases rather
27 than unit growth."
28

1 90. At the Citi Global Technology Conference on September 8, 2016, Micron CFO
2 Ernie Maddock noted: “there are again an increasing number of data points to suggest that you’re
3 going to see very little wafer addition, if any.” When asked if Micron would change their supply
4 plans in response to improving demand, Maddock reiterated their commitment to the common plan
5 with their competitors: “Well, I mean we have basically announced what we intend to do in terms
6 of bit growth and we’re sticking to that.” In response to a question as to whether he foresaw any of
7 the producers increasing wafer capacity, Maddock noted:

8 While I would love to tell you that our competitors have sent us a memo telling us
9 what their expansion plans are, unfortunately I can’t report that, but certainly we
10 read the same thing that each of you read and it does suggest that the focus of
11 capital spend in 2017 is going to be NAND as opposed to DRAM on the part of
12 many folks in the competitors face. And as I mentioned, we would expect all of
13 our bit growth to come from technology transition as opposed to any sort of wafer
expansion. There have been some pretty dramatic things published which I won’t
repeat here relative to potentially what’s going on with some of our competitors
and how they’re choosing to use their productive capacity, but there’s no sign
anywhere in the market that suggests there’s a plan to expand DRAM wafer
capacity.

14 91. By October 2016, Micron was reporting “better-than-expected” fourth quarter
15 revenue. Analysts noted that “[w]ith DRAM prices rebounding to 7 month highs, Micron is
16 benefiting as the supply glut in the market has dried up following aggressive cut backs in
17 production amid signs of a bounce back in demand.” Micron’s Durcan said, “We are seeing
18 marketing conditions in terms of both slowing supply growth and improving demand across key
19 segments.”

20 92. On Micron’s October 4, 2016 earnings call, Durcan noted:

21 We’ve seen further evidence that DRAM wafer output is declining as a result of
22 lost throughput related to the 20-nanometer and 1X nanometer conversions.
23 Absent some replacement of these wafers, we could see industry supply growth as
24 low as mid-teens in 2017. As some of lost wafer output is replaced, industry
supply growth could be in the high-teens percent range. This compares to our
long-term bit demand growth forecast in the low to mid 20% range.

25 Given this, Durcan further stated that Micron felt “pretty good about where [it sat] given trends in
26 the marketplace” and that it did not “feel quite as much urgency as we might under different
27 market conditions.

28 93. In its October 27, 2016 earnings call, Samsung again noted that its bit growth rates
would “be in line with market bit growth in DRAM next year. Once again, as we have always

1 mentioned, regarding DRAM, our focus is not to increase our market share but to maximize our
2 profits.” In response to a question on the potential to add wafer capacity, Samsung reiterated its
3 position: “Regarding the DRAM, once again, our bit growth will be focused more on process
4 migration. And so as we have mentioned, we will be focusing on quickly and flexibly responding
5 to the market environment as it unfolds.” Reiterating again, “And once again, in terms of our
6 DRAM business, our basic approach [is] that we will be more profitability-oriented than market
7 share-oriented and we plan to next year, at this point, expect to grow at market level.”

8 94. Regarding investment and capacity plans for DRAM, Samsung reiterated that
9 although they would be executing “supplementary investment on the remaining space of Line 17,”
10 “this is not to increase capacity, but to supplement and make up for the natural capacity decrease
11 that we experience as we migrate towards 1X.” Continuing, “Currently we have no plans of
12 increase – or adding a DRAM capacity to the Pyeongtaek campus.”

13 95. At the Credit Suisse Technology Media & Telecom Conference on November 29,
14 2016, Ernie Maddock, Micron’s CFO noted:

15 I think a lot of that confidence goes back to the fundamental view of this supply
16 and this demand. With no way for additions, we are increasingly present that you
17 are going to see this supply grow, at something less than 20%, and even with
 some room for error on the DRAM with demand side, we still see a number there
 north of 20%.

18 He continued “our objective is to close the gap and make it as narrow as reasonable without doing
19 anything that would potentially be disruptive to our performance or the industry’s performance.”

20 96. At the Barclays Technology Conference on December 7, 2016, Micron’s Maddock
21 recognized the change in Samsung’s behavior, noting that the “absence of capacity additions”
22 meant the industry was now “back into this fundamentally healthier period.” Maddock also
23 forecast that supply would grow slower than demand: “So as we look at the supply side of the
24 house, somewhat between 15% and 20% supply growth coming from these technology transitions
25 and that is against a demand environment that we think is going to grow somewhere in the range of
26 20% to 25% on a bit basis.”

27 97. On Micron’s earnings call on December 21, 2016, Micron’s Durcan differentiated
28 the current situation from that seen in 2014 and indicated that Samsung had learned from its

1 mistakes in 2014: “Well I think that part of what happened in the last latter stages of the last cycle
2 where perhaps a little bit a miscalculation by one of the suppliers, but that they probably learned
3 from so there is that.” He continued that Micron “had no plans to add new wafers this year.” In
4 response to investor questions concerning additional capacity, he noted:

5 We don’t have great crystal ball as to where our competitors are doing. We read
6 the same reports that you guys read. All of that plus all the other internal
7 intelligence we can generate that baked into our ranges and in the data sheet that
8 we provided. So I think there has been some chatter recently potentially about few
9 incremental wafers from one of the suppliers. Our view of that is if that were to
happen, it’s a relatively minor adjustment in terms of the overall scope of the bit
growth that we’re projecting and it would probably not cause us to change that
range that we’ve giving you.

10 Durcan further stated that “[f]or the industry, supply is slowing, demand is stronger on a number of
11 key segments, and inventory is at low levels.” Micron’s confirmation that it monitored its
12 competitors’ reports and statements indicated its understanding that Samsung and SK Hynix would
13 be expected to receive the messaging in Micron’s own statements, in addition to making clear that
14 Micron would receive and act on reassurances that Samsung and SK Hynix gave publicly, before
15 they could be confirmed out of the public eye as well.

16 98. Industry analysts noted in early 2017 that while the global increase in DRAM bit
17 demand was expected to surpass 20% in 2017, global DRAM bit supply—which is almost entirely
18 controlled by Defendants—was expected to grow by just 19% in 2017.

19 99. At the Needham Growth Conference on January 10, 2017, Micron’s CFO Ernie
20 Maddock, discussed Micron’s confidence that its competitors would not increase supply: “I think
21 their comments need to stand on their own and their comment seems to suggest a rational approach
22 to addressing the supply/demand constraints of the DRAM market.” Maddock repeated Micron’s
23 commitment to the common plan: “Our review of the DRAM business is that there will be
24 somewhere between 15% and 20% bit supply from Micron and all the other participants in the
25 industry. And then from a demand point of view, we think demand is going to be somewhere a
26 little bit north of 20%, so somewhere between 20% and 25%.”

27 100. At its fourth quarter earnings call for 2016, Samsung again recommitted to limiting
28 its bit growth in line with the market: “For Q1 2017, we expect the DRAM market bit growth to

1 decline high single digit and our bit growth will decline low-teens. For 2017, whole year, we
2 expect year-end bit growth to be high-teens and our bit growth will be similar level.” In response
3 to an investor question concerning Samsung’s ability to boost capacity, Samsung reiterated its
4 focus on technology migration, explaining:

5 We believe we are able to cover the current market demand through our
6 technology migration. So that is why we will be maintaining our operation
7 flexibly and try to cover the market demand within our technology migration. So,
8 given the size as well as the lead time necessary for increase of DRAM capacity,
9 we believe that temporary increase of DRAM supply is not very easy.

10 101. Concerning its capacity plans, Samsung stated that it would take a “step by step”
11 approach and emphasized it would be “monitoring the market situations as well as the
12 competitors.”

13 102. On January 25, 2017, SK Hynix announced its plans for “a DRAM bit shipment
14 growth that is on par with the market for this year.” SK Hynix similarly warned that “DRAM chip
15 supply growth may not keep up with demand.”

16 103. SK Hynix also announced on its fourth quarter earnings call on January 25, 2017
17 that “prices rose sharply for both DRAM and NAND as market improvement continued from the
18 second half of last year” and “profitability improved significantly across all products, thanks to
19 rising prices.” Regarding DRAM bit growth, however, SK Hynix stated that “throughout the first
20 half of this year supply is not going to meet the demand which remains very strong[.]”

21 104. On February 1, 2017, Moody’s Senior Analyst and Vice President, Gloria Tsuen,
22 supported SK Hynix’s positive rating outlook, noting that “SK Hynix’s 4Q 2016 results continued
23 to show pricing recovery in DRAM, amid strong demand and disciplined industry supply.”

24 105. In March 2017, Micron’s Durcan spoke to a reporter for Barron’s about supply
25 levels:

26 Durcan said in response to my question of whether a whole bunch of new supply
27 will enter the market, “We don’t see that happening right now.”

28 “As best we can tell, when we put all that we know in our own model, there is not
a big new wave of supply coming.”

Of course, “Further out, you get less certainty,” he conceded, “because people can
add wafers, but right now, there are fairly long lead times on equipment, so that’s
not going to happen any time soon.”

1 He added, in a formulation communicating certainty regarding the other Defendants' intentions,
2 that "*There are not enough new wafers coming to create oversupply.*" (emphases added).

3 106. On March 9, 2017, Micron's Maddock reiterated the same growth forecast of "15%
4 to 20% bit growth in supply and 20%, 25% sort of intrinsic demand growth" at the Susquehanna
5 Semi, Storage, & Technology Conference. Maddock noted, "But at the end of the day, it has
6 typically not been Micron who has expanded industry capacity when the margin profile upgrade . .
7 . all of the statements and all of the actions thus far suggest the things may indeed [be] different in
8 terms of how the participants are thinking about, the balance of profitability versus market share."
9 Maddock reiterated that Micron is "public about the fact that we have no current plan to add
10 wafers in any form."

11 107. On March 23, 2017, Micron also reiterated an industry-wide forecast of bit supply
12 growth between 15-20% and demand growth between 20-25%: "It's still, in our view, it's 15% to
13 20% supply growth this year, could actually be less than that if there's less new wafers than we
14 have in our plan. Demand is still 20% plus." In response to a question as to whether Micron would
15 add wafer capacity because of "such strong pricing out there in the market," Micron's Durcan
16 responded: "We're not focused on adding more supply . . . We do have white space in both our
17 Fab 16 in Taichung as well as Fab 10X, but we're not planning any capacity additions this year."
18 In response to a question concerning Samsung expanding supply, Durcan explained:

19 Again, I think the last cycle was a little different with that instability in supply
20 created by the Hynix fire. I don't know why they would intentionally repeat the
21 mistake from last cycle. They probably are enjoying making good margins . . .
22 Samsung is actually probably on the low end over the next couple of years
relative to what's going on in the industry as a whole. And the industry as a whole
is probably a little bit south of where we think demand growth is.

23 108. On its April 24, 2017, first-quarter earnings call, SK Hynix reiterated that "the
24 current projection for about 20% level growth is also based on the assessment of . . . all of the
25 factors." SK Hynix further stated that DRAM demand growth was "expected to outpace supply
26 growth" and that "[t]here is not enough clean room space to significantly increase DRAM
27 capacity[.]" As part of this market outlook, SK Hynix explained that it believed "that the supply
28 shortage will continue to the end of this year."

1 109. At Samsung's first quarter earnings call for 2017 on April 27, 2017, Samsung
2 confirmed its plan for its DRAM bit growth to be "aligned with the market." "For DRAM in Q1,
3 our bit growth declined low-teens, while ASP increased low-20%. For second quarter, we expect
4 DRAM market bit growth to be mid-single digit increase and we expect our DRAM bit growth in
5 second quarter to be high-single digit. And for the year, we expect DRAM market bit growth to be
6 high-teens and we expect to grow in line with the market." Again, in response to investor questions
7 about capacity, Samsung repeated its commitment that "we have no plans of additional capacity,"
8 other than to "make up for the loss that happens as we migrate to the 1X." Samsung noted,
9 "[W]e've always had a very flexible capacity operation that optimizes the capacity for each
10 product depending on the market situation that unfolds."

11 110. Samsung stated that the memory market was as of that point "now protected by
12 quite a high entry barrier, because memory business today requires not only the very cutting-edge
13 processors migrated, but also needs to have various high value-add solutions to go with the
14 products."

15 111. On May 24, 2017, at the JP Morgan Global Internet, Media and Technology
16 Brokers Conference, Micron's Maddock noted that Micron and its competitors—unlike previous
17 years—were being careful not to add supply: "if you listen to the commentary coming from
18 industry participants on the supply side it reflects a great deal of discipline and thoughtfulness with
19 respect to how the industry participants are considering supply expansion . . . Although we don't
20 speak for the industry, the other participants have spoken and indicated a great deal of discipline."
21 Micron reiterated supply growth that matched that of its competitors: "on the DRAM side you're
22 going to see somewhere between 15% and 20% growth in bits supplied, that's something that the
23 other suppliers in the market are also saying, within reasonable range." Micron also flagged that its
24 plans to avoid adding wafer capacity were consistent with those of its competitors:

25 I think that's reasonably consistent with certainly what we've said about our
26 intent, and then certainly the public comments of the other industry participants
27 have been pretty much exactly that. That while you do get some wafer loss as a
28 result of technology transitions, the intent that we have is to maintain flat wafer
outs, so essentially you are adding a little bit of capacity to make up for those lost
wafer outs, but as an industry as a whole, you are not adding substantial
incremental industry wafers and that would contribute to or allow you to get into
this 15% to 20% range in terms of bit growth.

1 112. On June 6, 2017, at the Bank of America Merrill Lynch 2017 Global Technology
2 Conference, Micron's Maddock noted the consistent approach taken to limit supply across the
3 industry:

4 And we feel that from a larger perspective over the course of a multi-year period,
5 it feels as very much as if you'll have good balance between supply and demand
6 as long as capital discipline is exercised. And certainly Micron has indicated the
7 difference to be reasonably disciplined with its capital investments, and other
8 industry competitors in their particular public disclosure[s] have said similar
9 things.

10 113. In response to questions as to how Micron expected competitors to act in the
11 improved industry circumstances, Micron noted:

12 I can say our view of industry bit demand will have to be materially different than
13 in the peers to be today to begin to have a think about expanding capacity well
14 beyond where we are thinking today which is predominantly to get that capacity
15 through technology transition . . . I don't think our view of how we look at the
16 industry is very – very different than how other rational smart people sitting and
17 other competitors tend to look at the industry.

18 114. At the Robert W. Baird Global Consumer Technology conference on June 8, 2017,
19 Micron's Maddock noted:

20 [T]here has actually been much more disciplined behavior on the part of the
21 remaining industry participants, of which there are now only 3, it's Micron,
22 Samsung and Hynix. And so while each of us is assessing the market, looking at
23 the market, I think there's great consistency between suppliers relative to our
24 view of market growth opportunities on the demand side. And what you see being
25 exercised today is disciplined investment around expansion of capacity relative to
26 expansion of demand. And each one of us has made our own independent
27 comments on what we think makes sense for our particular company. In Micron's
28 case, we said that we have no plans for additional new wafer fab capacity that we
will get the bits that we require to serve the market from technology transitions.

1 115. On Micron's June 29, 2017 earnings call, Micron President, CEO, and Director
2 Sanjay Mehrota noted Micron's position that "for calendar 2017, we expect DRAM industry bit
3 supply growth of between 15% and 20%, slightly below our view of demand growth." In response
4 to a question regarding Micron's views on adding more DRAM wafer capacity, Mehrota reiterated
5 Micron would focus on technology transitions instead of increasing capacity: "In terms of any new
6 capacity, I mean, we would certainly have to first make sure that we have captured the maximum
7 potential of our technology transition capability in manufacturing. And then we'll have to certainly

1 see that there is sustained projection or sustained demand growth in the years ahead before we
2 consider adding new capacity.” Again, Micron’s comments signaled its ongoing commitment to
3 the output restriction scheme to Samsung and SK Hynix.

4 116. At SK Hynix’s second quarter earnings call on July 24, 2017, SK Hynix similarly
5 stated its plan for DRAM bit shipment at “low 20% on par with the market.” It further signaled to
6 the industry its intention to increase capacity, saying, “for both DRAM and NAND, there is some
7 capacity increase planned within this year, especially because for DRAM . . . we cannot meet the
8 growing market demand only with technology migration[.]”

9 117. At Samsung’s earnings call on July 27, 2017, Samsung again stated its plan to keep
10 its bit growth aligned with the market growth. “In the third quarter, we expect market DRAM bit
11 growth to be high-single digit, and we expect our DRAM bit growth to be low-teens. And for the
12 year, we expect the DRAM market bit growth to be high-teens, and we expect our bit growth to be
13 aligned with the market growth.” Samsung recognized that “[d]ue to restriction of industry supply,
14 supply and demand remained solid and price continued to rise.” In response to investor questions,
15 Samsung reiterated again, that in contrast to its pre-Class Period aggressive market share focus,
16 “we will refrain from, for example, increasing market share, fighting on volume. . . . we will
17 flexibly manage our capacity by very closely monitoring the market situation, as well as the supply
18 and demand balance.”

19 118. On August 7, 2017, Micron’s Mehrota repeated the same gap between supply and
20 demand at the KeyBanc Capital Markets Annual Global Technology Leadership Forum
21 Conference:

22 Overall bit supply in the industry is in 15% to 20% range. And when you look at
23 the bit supply growth perhaps, may be a little bit toward the higher end of that
24 15% to 20% range. But, the demand projection, again, from all the mega markets
25 that I earlier talked about, point to greater than 20% demand for the industry. So, I
do believe that for 2017 and heading into 2018 as well, the industry fundamentals
will be healthy.

26 119. At the Citi 2017 Global Technology Conference on September 6, 2017, Micron
27 CFO Ernie Maddock recognized the importance of consolidation to limiting the increase in
28 capacity and reassured investors that this supply discipline would continue into 2018:

1 Relative to the supply side, I do think consolidation has been very instrumental in
 2 having a disciplined and orderly expansion of supply. We have certainly seen that
 3 now over period of a couple of years and we expect based on everything that we
 4 can see that you're going to continue to have a disciplined expansion of supply as
 5 we look forward into fiscal '18 for Micron.

120. Maddock also reiterated the focus on keeping supply growth below demand growth:

5 Well, if you listen to the public commentary of the industry participants, the key
 6 message across the Board is that the investments are mainly for technology
 7 transition with the desire to keep wafer starts roughly flat . . . But if you look at
 8 that, that will allow the industry to grow bits at this 20% plus or minus range over
 9 the course of any given year and certainly that feels very well matched to what we
 10 believe the demand to grow from a supply point of view, which is in the 20% to
 11 25% range.

121. On Micron's fourth quarter 2017 earnings call on September 27, 2017, Micron told
 10 investors that it expected the "industry to remain moderately undersupplied for the rest of 2017 for
 11 . . . DRAM." In response to questions as to when Micron would begin to outgrow the industry,
 12 Micron noted, "I would also tell you that our objective over a multiyear period is to grow at about
 13 industry levels . . . really important is the segment that we intend to grow aligned with industry
 14 over the course of these multiyear periods."

122. Similarly, SK Hynix reported on its earnings call on October 16, 2017 that it
 15 intended to grow its DRAM capacity "on par with the market" in 2018, even though the DRAM
 16 market was in a state of undersupply.

123. On a third quarter earnings call on October 25, 2017, SK Hynix reiterated what its
 18 intended growth figures were for DRAM, saying, "the prediction is about mid-20% level, which is
 19 higher than our initial plan . . . [W]e are forecasting about low 20% or around 20% level of bit
 20 growth for DRAM next year . . . And for Hynix, we . . . foresee that we will be roughly in line with
 21 market growth."
 22

124. At Samsung's earnings call on October 31, 2017, Samsung again signaled its plan
 23 to stay in line with the market.
 24

25 For DRAM, in the third quarter, our bit growth came in high single-digit and our
 26 ASP grew high single-digit as well. For the Q4, we expect market DRAM bit
 27 growth to be low single-digit and we expect our growth to be similar. That will
 28 bring the 2017 market DRAM bit growth to be approximately 20% and our bit
 growth will be mid-teens.

1 Samsung again reiterated that it would maintain its “profit first rather than market share
2 policy.” In response to investor questions, Samsung noted that its “basic approach to DRAM
3 capacity management is that we will flexibly manage our capacity especially depending on the
4 market situation for each product, as well as the migration in the 10-nano class process
5 technology.”

6 125. When discussing Samsung’s investments in their semiconductor business, Samsung
7 again signaled its commitment to limiting capacity in the DRAM market, noting that “the
8 investments we’re making this year and next year in our Semiconductor business is not for
9 immediate bit growth next year. We actually have a longer term horizon. We think that the
10 investments that we’re making now and next year is more for the overall business capabilities for
11 the next two to three years.”

12 126. In contrast to Samsung’s pre-Class Period aggressive fight for market share, by
13 2017 Samsung had lost market share, yet still focused on maintaining bit growth at market growth
14 levels. In response to a direct investor question as to whether Samsung planned “to regain its
15 previous market share next year or will you be more trying to maintain where you stand
16 currently?” Samsung again reiterated its commitment to avoiding competition for market share:
17 “the current guidance that we can give you is that for next year, our bit growth for DRAM is
18 expected to be at market growth levels.” A decline in market share held by an industry’s leader is a
19 plus factor potentially indicative of cartel conduct. Samsung had the highest market share
20 throughout this time period, yet it did not respond to the decline in its market share, focusing
21 instead on growing at market growth levels—despite having additional capacity it could have
22 activated to regain and further grow its share.

23 127. At the Credit Suisse Annual Technology, Media & Telecom Conference on
24 November 28, 2017, Micron’s Mehrota repeated the industry approach to keep supply growth
25 below demand growth: “For fiscal year ‘18, what we have said is, industry supply that growth 20%
26 . . . while the demand trends I believe will continue to be somewhat stronger than that . . . there
27 may be some wafer capacity additions but they will remain relatively small.”
28

1 128. At the Nasdaq Investor Conference on December 6, 2017, Micron's Maddock
2 stated:

3 We are not adding wafers for either technology in 2017. I think if you look at the
4 public comments of other suppliers they are adding marginal numbers of wafers.
5 But essentially if you look at the industry in aggregate even at the end of 2018 it's
altogether possible for DRAM that the number of wafers the industry produces is
the same or slightly less than it was some years ago.

6 Maddock noted in response to another question, "if you look at the public commentary of all the
7 industry participants . . . I think there is a general belief that the industry participants are keenly
8 aware of the fact that the DRAM market is relatively inelastic and the way you serve that market is
9 by making sure there is adequate, but not excess supply." Maddock went on to also say "we think
10 the industry for DRAM [*sic*] fairly healthy next year . . . we think supply is going to grow sort of
11 in the midpoint of 20% with a small range around that demand, we think will be in that range or
12 slightly higher that should create an opportunity for continued healthy industry conditions."

13 129. By late 2017, in response to manufacturers looking to enter the market, reports
14 indicated Samsung would soon increase capacity to lower prices and hurt the entry of competitors
15 to the DRAM market. But at its earnings call on January 31, 2018, Samsung again stated its
16 commitment to the collusive agreement when it stated its expectation to align with the market in
17 terms of bit growth:

18 In the fourth quarter, our DRAM bit growth came in low single-digit and we saw
19 our ASP increase about 10%. In the first quarter, we expect the market DRAM bit
20 growth to decline low single-digit and our bit growth will come in similar to that
of the market. And for 2018, at this point, we expect the DRAM market bit
growth to be about 20% and our bit growth will also come in similar level.

21 130. Samsung attributed the lack of capacity growth to the purported fact that "even
22 though the industry has been working very hard to increase supply, there are difficulties because of
23 the 10-nano class technology being very difficult. Also there are limits in terms of the cleanrooms
24 that are available."

25 131. Similarly, on its fourth quarter earnings call on January 24, 2018, SK Hynix stated
26 that it expected DRAM demand "to grow at 20% level" and that "supply will remain tight despite
27 higher investment across the industry[.]" Furthermore, this 20% growth would be "on par with
28 market growth." Additionally, SK Hynix acknowledged that restricting DRAM supply had led to

1 rising DRAM prices, stating “the memory semiconductor market last year went through an
2 unprecedented growth. Favorable market condition[s] continued throughout the year with supply
3 remaining tight due to ever-rising technological complexity and growing investment burden for
4 production.”

5 132. SK Hynix further stated on its first quarter earnings call on April 23, 2018 that
6 “demand for DRAM is expected to grow by low 20% level this year. Supply growth will not be
7 enough to ease the price supply situation, even if suppliers accelerate their migration to 1X nano
8 and continue to add wafer capacity by increasing investment.” SK Hynix described this growth
9 plan as “in line with market growth for both DRAM and NAND.” In response to specific questions
10 about capacity increase across the market and concerns for oversupply, SK Hynix stated that the
11 previous year’s “limited bit growth in DRAM supply [was] because of the continuing tech
12 migration.” Furthermore, SK Hynix believed that although price was “going to ease a bit . . . tight
13 supply will continue.”

14 133. On its first quarter earnings call on April 26, 2018, Samsung acknowledged that “in
15 spite of industry effort to increase the supply, extending bit growth is more likely to be limited due
16 to space constraint and increase in technology difficulty. Therefore, [the] DRAM market remain[s]
17 to be tight continuously.” Samsung further reiterated that it tried “to avoid competing over market
18 share and focus more on maintaining sustainable profitability and maintaining our capacity
19 flexibility to achieve those aims.”

20 134. Samsung signaled its ongoing commitment to this strategy during its second quarter
21 earnings call on July 31, 2018, explaining its “focus is on mid- to long-term profitability rather
22 than short term growth in volume and size, and that strategy has not changed.” Samsung then
23 noted that “despite the industry’s efforts to increase supply, we expect the industry situation to
24 remain solid because . . . it would not be easy for the increase in supply to catch up with the
25 growth in demand.”

26 135. On its fourth quarter earnings call on September 20, 2018, Micron reaffirmed that
27 as it “mentioned that [in] calendar year ’19, we see our supply bit growth in line with the industry
28 on DRAM side, which we expect to be approximately 20%.”

1 136. SK Hynix reported on its third quarter earnings call on October 25, 2018 that “the
2 severe supply shortage has begun to ease following DRAM makers’ efforts to meet demand
3 growth through supply.” This led SK Hynix to announce that it “will now focus on improving
4 investment efficiency,” as “there has been active investment with an eye toward easing the tight
5 supply.”

6 137. Micron further signaled its intention for 2019, saying on its first quarter earnings
7 call on December 18, 2018 that its “seeing weakening demand” from customers and as a result,
8 “taking decisive actions, including a meaningful reduction in our fiscal 2019 CapEx plan, in both
9 DRAM and NAND that will materially reduce our supply bit growth.” Micron went to specify that
10 it would be lowering “DRAM bit output growth to approximately 15% for calendar year 2019
11 versus our prior plan of around 20% bit growth.”

12 **G. Defendants’ Conspiracy Was Successful – DRAM Revenue Grew 76% in**
13 **2017**

14 138. The conspiracy was successful. Global DRAM prices rose from June 2016, “on
15 account of higher DRAM content in mobile devices and significant under-supply of PC DRAM
16 and a slowdown in capacity expansions.” According to reports, DRAM revenue grew 76% in
17 2017, with Samsung reporting a total of \$10.1 billion in DRAM revenue for the fourth quarter of
18 2017. SK Hynix reported fourth quarter DRAM revenue of \$6.3 billion, while Micron reported
19 \$4.6 billion in DRAM revenue for the same period. Industry reports credited this “near-historic
20 high market spike” to “a lack of major fab expansion plans, yield difficulties with leading-edge . . .
21 processes, demand for high performance (graphics) DRAM from gaming systems and data center-
22 based server applications, and increased average content for mobile DRAM used in smartphones.”
23 Industry reports noted that “most PC OEMs negotiated first quarter DRAM contracts at the end of
24 2016, when DRAM was in tight supply. Not only did these price increases affect PC DRAM but
25 they also spilled over into the server and mobile DRAM markets, increasing the price of mobile
26 DRAM products by nearly 10 percent on average[.]”

27 139. As the prices for DRAM increased, Defendants’ revenue soared, rising more than
28 50% during the Class Period. Between the first quarter of 2016 and third quarter of 2017,

Defendants' revenues from global DRAM sales more than doubled. In the third quarter of 2017, Samsung achieved a record-high revenue of \$8.7 billion from its global DRAM sales (Q1 2016 revenue was \$3.9 billion); SK Hynix achieved record-high revenue of \$5.5 billion from its global DRAM sales (Q1 2016 revenue was \$2.3 billion), and Micron achieved record-high revenue of \$4.0 billion from its global DRAM sales (Q1 2016 revenue was \$1.5 billion). In Q1 2018, all these top three suppliers have pushed their respective operating margins to 50-70%, the highest recorded in the history of their companies.

H. Chinese Regulators Began Investigating the DRAM Industry in Late 2017

140. By late December 2017, foreign regulators had started to investigate the DRAM industry.

141. On December 26, 2017, concerning the DRAM industry, an official from China's National Development and Reform Commission ("NDRC") Pricing Supervision Department stated to the China Daily newspaper, "We have noticed the price surge [in the last 18 months] and will pay more attention to future problems that may be caused by 'price fixing' in the sector." On February 1, 2018, Samsung and the NDRC reportedly entered a Memorandum of Understanding where Samsung agreed to increase manufacturing capacity.

142. In April 2018, SK Hynix publicly announced that it was adding wafer capacity by 6-7% per year to meet demand growth.

143. On May 24, 2018, antitrust officials from China's Anti-Monopoly Bureau of the Ministry of Commerce met with Micron to "express concerns" about continued price increases for PC DRAM products.

144. China's State Administration for Market Regulation ("SAMR")³ carried out surprise inspections of Samsung, SK Hynix, and Micron, at their Beijing, Shanghai, and Shenzhen offices on or around May 31, 2018.

³ In March 2018, the Chinese government consolidated the duties of its three competition agencies into a new government agency to handle all antitrust matters. Previously, the NDRC was responsible for investigating price related monopoly agreements, abuse of dominance, and abuse of administrative power. The State Administration for Industry and Commerce ("SAIC") was in charge of investigations into non-price related monopoly agreements and abuse. The Ministry of Commerce ("MOFCOM") handled merger control filings. In the bureaucratic shakeup, the

1 145. On June 1, 2018, Bloomberg News reported that Micron had confirmed it is
2 cooperating with SAMR, who visited Micron's China sales offices on May 31, 2018.

3 146. On June 4, 2018, Bloomberg News reported that Samsung had confirmed that
4 investigators from China's regulatory agency visited their Chinese sales office on May 31, 2018.
5 SK Hynix said separately it was being investigated by China's government and was cooperating.
6 South Korean media reported that China was accusing the Defendants of colluding with each other
7 to hike memory chip prices.

8 147. On June 27, 2018, Chinese media reported that SAMR raided DRAMeXchange's
9 Chinese offices.

10 148. In November 2018, the head of China's anti-monopoly bureau under SAMR, Wu
11 Zhenguo, announced that the investigation into manufacturers of DRAM memory chips had made
12 important progress and that a large amount of evidence had been obtained. Having officially
13 launched the probe at the end of May 2018, the regulator has already amassed a significant amount
14 of evidence from the three companies, Wu told a press conference. The agency has obtained and
15 screened evidence from these companies and their downstream partners; the next step is to focus
16 on how to define the case itself, the companies' market dominance position as well as their
17 relevant practices.⁴

18
19 **I. Trade Associations Provided Further Opportunities for Defendants to Conspire**

20 149. Trade associations provided opportunities for Defendants to meet frequently and
21 exchange information to facilitate collusion. Defendants are members of several trade associations
22 in the United States, Asia and Europe. Their common membership in trade associations also
23 provided an incentive for Defendants to adhere to their agreements, as they could monitor one
24

25
26 antitrust responsibilities of the NDRC, SAIC, and MOFCOM were consolidated under the control
27 of a new government agency, SAMR, the agency that raided the Defendants' offices.

28 ⁴ Antitrust officials: All firms treated equally, The State Council, the People's Republic of China,
available at
http://english.www.gov.cn/state_council/ministries/2018/11/17/content_281476393933442.htm
(last visited Oct. 28, 2019).

1 another's activities in the DRAM market and punish non-compliance. Defendants' participation in
2 trade associations, as described below, helped facilitate their collusion.

3 150. **Joint Electron Device Engineering Counsel ("JEDEC"):** All three of Micron,
4 Samsung, and SK Hynix are members of JEDEC, a semiconductor engineering trade organization
5 and standards setting entity that among other things develops and facilitates adoption of open
6 industry standards for DRAM. Such standards can enhance interoperability of devices and
7 interchangeability among components manufactured by different suppliers. Micron, Samsung, and
8 SK Hynix have all played key roles in formulating JEDEC DRAM standards.

9 151. JEDEC committee and subcommittee meetings are generally off limits to the public
10 and limited to JEDEC "members, their designated alternates, and guests invited by the committee
11 or subcommittee chairperson," per JEDEC's official policies. Therefore unlike public investor
12 calls and conferences where press or other members of the public might have occasion to attend,
13 JEDEC provided a more secure forum where Defendants and their fellow members could engage
14 in confidential—and, illicit—communications.

15 152. A confidential witness who worked as a marketing executive for SK Hynix during
16 the conspiracy has come forward and confirms that JEDEC conferences occurred approximately
17 six times per year. JEDEC meetings generally included 80 to 100 attendees and took place at
18 hotels in desirable destinations. This confidential witness also confirms that Micron, Samsung, and
19 SK Hynix all sent personnel including senior leadership to JEDEC conferences.

20 153. Perhaps owing in part to previous anticompetitive conduct in the DRAM industry
21 by JEDEC members that concluded with major fines and multiple criminal convictions, JEDEC
22 maintains an antitrust policy that among other things prohibits "discussion or exchange of
23 information . . . regarding future plans concerning the production, distribution or marketing of
24 particular products; or any other statistics or figures pertaining to a company's business operations.

25 154. As noted *supra*, during the conspiracy in the Class Period and the years directly
26 preceding, the Defendants conducted much of their collusion through investor calls, public
27 conferences, and other public-facing statements. JEDEC meetings, however, provided an ideal
28 forum for Defendants to coordinate out of public view, build trust, and monitor each other's

1 activities and raise and resolve any concerns that any of the conspiracy participants intended to
2 deviate from the plan. As the confidential witness has further explained, “at JEDEC, you could talk
3 to competitors about what they were seeing in future volume. You can talk about overall volume
4 expectations.” Plaintiffs allege that sharing of such information through direct face-to-face
5 communications further confirmed, reinforced, and buttressed credence to the commitments that
6 Defendants had largely mapped out in the public statements first initiated by Micron.

7 155. In addition to JEDEC, Defendants had opportunities to meet and communicate at
8 and on the margins of an array of other industry organizations and conferences.

9 156. **Semiconductor Industry Association (“SIA”)**: SIA is an association for the U.S.
10 semiconductor industry. Micron is a member of SIA, along with other U.S. semiconductor
11 manufacturers. Samsung and SK Hynix are listed as international members. Micron’s President
12 and CEO Sanjay Mehrotra is on the Board of SIA. The U.S. based SIA is affiliated with branches
13 in other regions of the world including in Korea, Japan, China, and Europe. It is also linked to the
14 World Semiconductor Trade Statistics Organization and the World Semiconductor Council.
15 Defendants belong to all these associations.

16 157. SIA holds various events, such as its “Annual Award Dinner” which Defendants’
17 key executives attend. For example, at its annual dinner on November 14, 2017, Micron’s then-
18 CEO Mark Durcan was featured as an award winner and potential speaker. The program of events
19 for the November 14, 2017 meeting also included a CEO Reception and a Post-Party, providing
20 further opportunities for social interaction or side conversations among members.

21 158. **Korean Semiconductor Industry Association (“KSIA”)**: Like SIA, KSIA
22 provides opportunities for the Defendants to be in contact and to directly communicate and share
23 competitive information with one another.

24 159. KSIA’s membership list includes both SK Hynix and Samsung on its device
25 manufacturer member list, with only four other entities listed as device manufacturer members.
26 This small number of member companies makes it possible for members to be in contact and
27 exchange information.

1 160. In March 2016, Sung Wook Park, the CEO and Vice Chairman of SK Hynix was
2 inducted into the leadership of KSIA.

3 161. The KSIA Board of Directors includes Samsung's Jin Kyo Jin and SK Hynix's Lee
4 Suk-hee as Chairman and Vice Chairman, respectively.

5 162. KSIA also holds events and conferences for its members. For example, KSIA holds
6 an annual meeting each year. SK Hynix has been noted as one of the event organizers for, at least,
7 the 2016 annual meeting.

8 163. On October 17, 2017, the KSIA announced the 19th SEDEX (Semiconductor
9 Exhibition) at COEX in Seoul. In attendance were employees from Samsung and SK Hynix.

10 164. On October 26, 2017, the SKIA held its 10th Semiconductor Day commemoration
11 ceremony in Seoul. The event commemorated the Joint Declaration of Win-Win Cooperation to
12 Strengthen the Semiconductor Industry Ecosystem and was attended by Jin Kyo-young of
13 Samsung and then Vice Chairman of the KSIA Park Sung-wook of SK Hynix.

14 165. On October 24, 2018, the KSIA announced that the 20th SEDEX (Semiconductor
15 Exhibition) was held at COEX in Seoul. In attendance were employees from Samsung and SK
16 Hynix.

17 166. In February 2019, senior executives from SK Hynix and Samsung attended one of
18 the KSIA's Regular Seminar Meetings.

19 167. KSIA is connected to SIA and other country-specific branch organizations. At
20 times, the various country affiliates gather for worldwide conferences and events, providing further
21 opportunities for Defendants to join in person.

22 168. While much of the information on these organizations is kept private for members
23 only, these organizations clearly provide a channel through which Defendants had the opportunity
24 to discuss and/or exchange information directly during the Class Period.

25 169. **World Semiconductor Council ("WSC"):** The World Semiconductor Council
26 "promotes international cooperation in the semiconductor sector in order to facilitate the healthy
27 growth of the industry from a long-term global perspective." WSC holds at least one meeting a
28 year. For example, in May 2018, it held its World Semiconductor Council Meeting for WSC

1 members only in Coronado, California. Notably, WSC held a meeting of over 100 CEOs and other
 2 semiconductor executives on May 26, 2016 (a few days before the start of the Class Period on June
 3 1, 2016). The conference was led by Sung Wook Park (CEO of SK Hynix and held leadership in
 4 KSIA), who was chairman of the KSIA at the time. That WSC was also attended by Jun Young-
 5 Hyun (President of Semiconductor Memory Business at Samsung Electronics) and Synn Seung-
 6 Kook (SVP at SK Hynix). Synn was also KSIA's chairman and representative at the 2017 and
 7 2018 WSC. Note also that for the 2015 WSC in China, the KSIA was chaired and represented by Ji
 8 Hyun-ki, a director at Samsung Electronics in charge of planning for the memory business.

9 170. **World Semiconductor Trade Statistics Organization ("WSTS"):** Defendants
 10 also participate in WSTS, a non-profit, which provides semiconductor market data and forecasts.
 11 WSTS compiles monthly sales numbers for the semiconductor industry, including DRAM, and
 12 provides twice yearly semiconductor industry forecasts with quarterly and annual projections. A
 13 subscription to the WSTS Database also includes statistics on Semiconductor Capacity Utilization
 14 (known as SICAS Reports). WSTS is primarily funded by membership fees of participating
 15 semiconductor companies, whose representatives form the WSTS Committee. The members of this
 16 Committee submit accurate and authentic monthly revenue data, attend regional meetings, and
 17 contribute to the generation of world semiconductor industry forecasts.

18 171. Semiconductor companies that seek to be WSTS members must agree to provide
 19 member company revenue data and pay membership fees. Members then can access all the
 20 information that WSTS provides. If a company is unable to provide revenue data into the WSTS
 21 statistics program, it can buy access as a subscriber.

22 172. All three Defendants are members of WSTS. Micron is a member of the Americas
 23 Regional Group, and Samsung and SK Hynix are members of the Asia Pacific Regional Group.

24 173. Several partners support WSTS in the operation of market statistics information
 25 services. Data Collection Agents ("DCAs") receive the revenue data from WSTS member
 26 companies and keep this data under their custody. WSTS has appointed regional DCAs who
 27 collect revenue data from member companies and consolidate this data into the regional base
 28 report. Regional DCAs forward the regional base report at defined dates to the worldwide DCA.

1 The worldwide DCA consolidates all the data of the regional base reports and merges this data
2 with non-participant estimates that are provided by WSTS. DCAs are also responsible for checking
3 the submitted data for completeness, consistency and plausibility. They resolve any perceived data
4 anomalies with the submitting member companies. Finally, the worldwide DCA posts these data
5 compilations under the name of the various market statistics reports on the WSTS Internet Portal.

6 174. Sharing of revenue and production data through WSTS provided an additional
7 means for Defendants to verify their co-conspirators' adherence to their anticompetitive plan.

8 175. Semiconductor Industry Associations in the different regions closely cooperate with
9 WSTS. In most cases they also hold distribution licenses for WSTS market statistics reports and
10 forecasts to serve interested parties outside the WSTS membership.

11 176. In addition, WSTS holds meetings for its members. For example, it will hold its
12 spring 2018 Committee Meeting in Vienna, Austria. As explained on its meeting registration page,
13 "each WSTS Member Company has one official representative in the Committee, who is expected
14 to participate in the Committee Meeting." Participation in the Forecast Meeting is subject to the
15 submission of a pre-meeting forecast. The process includes companies submitting their forecast
16 information and then publication of the pre-meeting average forecast to all participating
17 companies.

18 177. WSTS describes the value of its regular meetings as "an important venue for
19 members to help shape forecasts and future reports, and to interact with their industry peers. . . .
20 Members are able to exchange experiences with other market participants, gain important
21 information about current market sentiment, and hear directly from their peers how they view the
22 future direction of the market."

23 178. WSTS holds a number of different types of meetings for members, including: Board
24 of Directors Meetings (at least twice a year); Executive Committee Meetings, including the World
25 Chairman and the five Regional Chairs (at least twice a year); Working Group Meetings where
26 certain WSTS members gather in regional or sector-specific groups; Committee Meetings where
27 members' primary focus is to review the current situation in the semiconductor market and to
28

1 formulate forecasts for the upcoming quarters and following two years (twice a year); and
2 Regional Chapter Meetings (two to four times per year).

3 179. **Global Semiconductor Alliance (“GSA”)**: GSA represents about 350 member
4 companies, including Micron, Samsung, and SK Hynix. GSA holds a Memory Conference once
5 every two years. For example, the conference was held in March 2015 and June 2017. GSA also
6 holds an annual U.S. Executive Forum conference in September or October, an annual European
7 Executive Forum in April, May, or June, and an Annual Awards Dinner in December.

8 180. The GSA’s Board of Directors included Naga Chandrasekaran, SVP at Micron, and
9 DR. JS Choi, President of Samsung Semiconductor, Inc. GSA’s Asia-Pacific Leadership Council
10 includes Dr. JS Choi and Dr. Sung-Wook Park, Vice Chairman of SK Hynix.

11 181. At the June 2017 GSA Memory Conference in Shanghai, Brian Shirley, Micron’s
12 VP of Memory Solutions, appeared as the keynote speaker. He further participated in a panel and
13 was selected to give a presentation at the conference.

14 182. **SEMI International Technology Partners Conference (“ITPC”)**: The ITPC, is
15 an annual industry gathering of executives in the semiconductor and microelectronics
16 manufacturing industry.

17 183. In 2014, the ITPC attendee list included Mark Adams, President of Micron
18 Technology, and Sung Wook-Park, President and CEO of SK Hynix.

19 184. In 2016, the ITPC attendee list included Micron’s Norm Armour and Samsung’s
20 Ho-Kyu Kang.

21 185. In 2017, the ITPC attendee list included Samsung’s Seok Woo Nam and SK
22 Hynix’s Seok-Hee Lee.

23 186. In 2018, the ITPC attendee list included Jong Hoon Oh, Senior VP and GM for
24 DRAM development at SK Hynix.

25 187. In 2019, the ITPC attendee list included Micron’s President and CEO Sanjay
26 Mehrotra and Vice President and Samsung’s Head of Memory Manufacturing Center Vice
27 President Siyoung Choi, both of whom were scheduled to speak on November 3rd.
28

188. All of these touch points created opportunities for Defendants' executives to familiarize themselves with one another and create the trust necessary for sustaining the conspiracy.

J. The DRAM Industry Has A History of Collusive Activity

189. The United States Department of Justice ("DOJ") brought criminal charges against the Defendants (and other makers of DRAM that existed at the time) in 2005, for conspiring to fix the prices of DRAM sold in the United States between 1999 and 2002. Samsung and SK Hynix⁵ pleaded guilty to the DOJ's charges, paying some of the largest criminal fines in history for their illegal conduct. Micron also admitted to participating in the conspiracy but received amnesty from prosecution in exchange for its cooperation under the DOJ's Antitrust Corporate Leniency Program. The DOJ imposed a \$185 million criminal fine on SK Hynix in 2005, the fourth largest criminal antitrust fine at that time. That same year, Samsung agreed to plead guilty and paid a \$300 million fine. Samsung's fine was the second largest criminal antitrust fine in U.S. history and the largest criminal fine imposed since 1999 at that time. Fourteen individual employees of Defendants also pleaded guilty for participating in the conspiracy. They paid fines of \$250,000 each and served prison sentences ranging from seven to fourteen months. Some of Defendants' employees involved in the collusive acts of the last DRAM conspiracy still hold key leadership positions with Defendants today. Defendants' previous convictions for conspiring to fix DRAM prices support the plausibility of the conspiracy alleged in this complaint.

190. The DOJ has also investigated Defendants for price fixing in similar semiconductor memory markets, including the markets for static random access memory ("SRAM") and NAND (generally referred to as "Flash"). Defendant Samsung and its wholly owned subsidiaries pleaded guilty in a number of other related electronic component price-fixing conspiracies.

K. Additional Opportunities to Collude

191. In 2013 and 2014, just prior to the start of the Class Period, SK Hynix hired three former Samsung executives, Lim Hyung-kyu, Suh Kwang-pyuk, and Oh Se-young.

⁵ In 2005, at the time of the DOJ investigation, SK Hynix was known as Hynix Semiconductor Inc. For consistency, Plaintiff uses "SK Hynix" in this section, although the company did not change its name to SK Hynix until 2012.

192. Upon being hired, SK Hynix made these three individuals responsible for its semiconductor business.

193. At Samsung, Suh Kwang-pyuk served as Vice President of Samsung Electronics' system large-scale integrated circuit operations and Oh Se-young developed memory chips.

L. The Economic Evidence is Consistent with the Existence of a Cartel

194. The economic evidence also supports the existence of collusion between the Defendants.

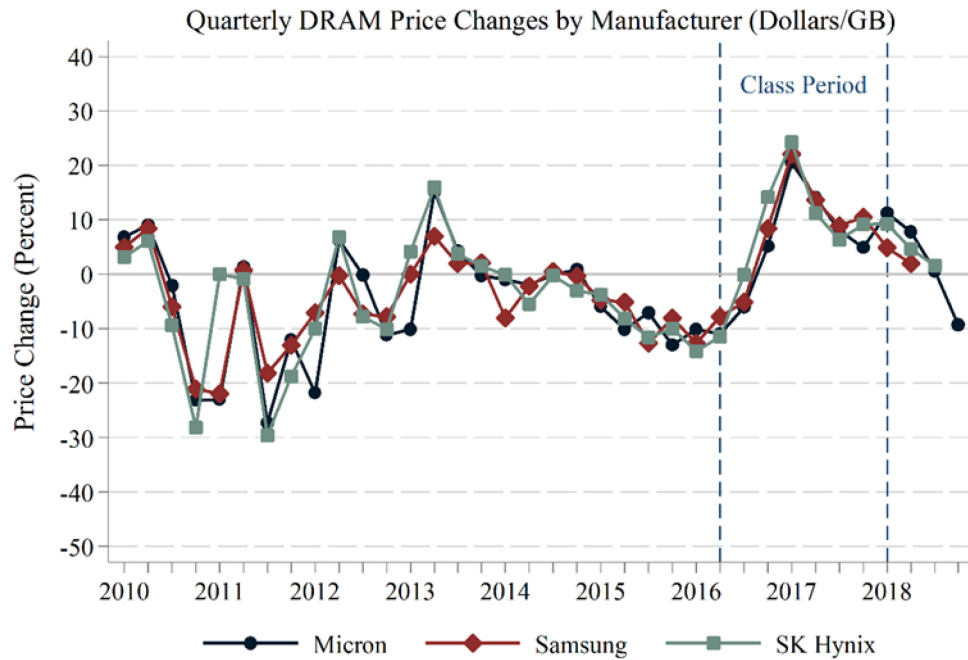
195. Economists commonly employ certain economic tests or "screens" to detect the existence of a cartel in each industry. The following tests or screens are commonly used by economists and supported by the relevant peer-reviewed publications as "collusion screens."

1. While the Pricing Levels in the Pre-Conspiracy Period Were Highly Varied and Volatile, the Level of Price Variation Between the Defendants Substantially Reduced During the Conspiracy Period. This Economic Evidence Regarding the Convergence of Price Variability is Consistent with the Existence of a Cartel

196. One commonly employed collusion screen utilized by economists is to compare the variance between Defendants' pricing during non-conspiracy periods with their pricing during the conspiracy period. Economists have recognized that typical price-fixing cartels often not only increase average prices, but also make prices less responsive to cost changes, thereby resulting in diminished overall price variance.⁶

197. With respect to the Defendants' DRAM pricing, as the following chart (Figure 1) demonstrates, the period before alleged conspiracy generally was characterized by much greater volatility and price variance between the Defendants, and the differences in the price variation cannot be attributable to the number of actors in the market alone. The overall variance of price changes outside the conspiracy period was more than 10 times higher than during the conspiracy period.

⁶ R. Abrantes-Metz, L. Froeb, J. Geweke & C. Taylor, "A Variance Screen for Collusion," International Journal of Industrial Organization, 24, 467-486, 2006.

Figure 1: DRAM Prices

Source: Company Results; DRAMeXchange; Wells Fargo Securities LLC.

198. In contrast to the pre-conspiracy period, Figure 1 demonstrates that during the conspiracy there is a strong convergence of price changes by the Defendants. Defendants' price changes track very closely to one another throughout the conspiracy period, but then appear to break down again after the raids by the Chinese competition authority, and the filing of these complaints, during the post-conspiracy period. Given the history of greater price variation and volatility during both the pre- and post-conspiracy periods, the foregoing economic evidence is consistent with the existence of a conspiracy.

199. Indeed, while there have been some periods where prices converged temporarily due to the ordinary push and pull of economic forces in a competitive market, the period of collusion before and during the Class Period stands out as featuring abnormally low variation sustained for an abnormally long period. The year 2010, for example, featured very little variation as well, but while prices were in decline, a pattern consistent with competitors undercutting each other and then dropping prices to match or beat the competition. Moreover, consistent with a healthy competitive marketplace, variation soon reappeared as suppliers staked out their own strategies.

200. A similar lack of variation in a declining price environment reappeared in 2014, but this time unlike the last the rigid price alignment stuck, unbundling only slightly in 2015 and 2016.

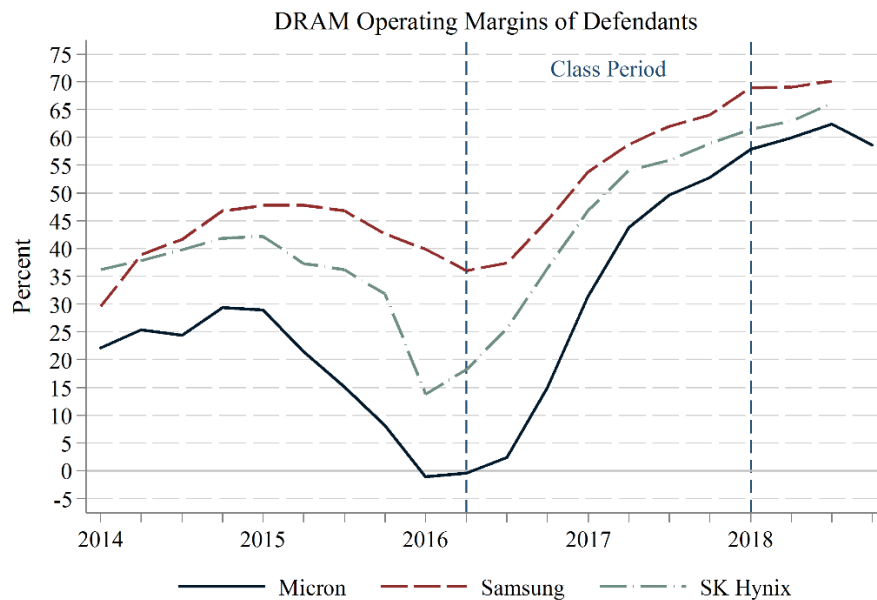
201. Then, in a glaring aberration rarely if ever seen in a market not tainted by collusion, prices drastically spiked as Defendants' collusive scheme took hold while the market continued to exhibit an almost total absence of price variation, and the Defendants' strict adherence to price parity and resolute refusal to expand production to market clearing levels shut off all avenues for Plaintiffs to avoid paying overcharges.

2. Defendants' Margins on DRAM During the Conspiracy Period Increased Greatly to Uncompetitive Levels

202. Economic theory indicates that the DRAM industry did not function as would be expected if it were competitive. In industries that are characterized by cyclical demand and short-term inelastic supply, such as electronic components, margins are expected to be higher during the periods of high demand and lower during the periods of low demand. However, economics teaches that if an industry is truly competitive, firms' prices will be pushed close to marginal costs so that the margins will be low or near zero on average.⁷

203. However, as the following chart demonstrates (Figure 2), the DRAM-specific margins the Defendants received during the conspiracy period all went up dramatically as compared to the pre-conspiracy period and were sustained at these supra-competitive levels. Indeed, Samsung's DRAM margins appears to grow by 35% from the pre-conspiracy period to 70% close to the end of the conspiracy period. SK Hynix's margins appear to have grown by an astounding 40% by the end of the conspiracy period as compared to just before the conspiracy period. Even more dramatic, Micron's margins moved from a negative number just before the conspiracy period to obtaining near 60% margins on DRAM by the end of the conspiracy period.

⁷ See, e.g., Lieberman, Marc and Robert Ernest Hall. Introduction to economics. Thomson South-Western, 2000.

Figure 2: DRAM Margins

204. The extraordinarily high margins that the Defendants obtained during the conspiracy period, as set forth in Figure 2, are also indicative of the existence of the cartel, especially when compared to the margins they obtained during non-conspiracy periods.

205. It should furthermore come as no surprise that Defendants' margins on DRAM remained high following the Class Period after Samsung made its deal with the Chinese government to begin ramping production back up in 2018. While economists often posit idealized markets free from transfer costs as a means to provide clear examples to demonstrate economic principles, in the real world buying and selling is a messy business and prices often do not immediately rise or fall to competitive levels once a distorting factor has been eliminated.

206. An academic article by economist Kenneth Flamm entitled "Semiconductor Dependency and Strategic Trade Policy"⁸ furthermore confirms that factors specific to the DRAM industry increase the likelihood that prices would not adjust instantaneously:

Four features of DRAM production (and, more generally, semiconductor production) need to be addressed by models of the industry... The second feature is capacity constraints. There are long gestation lags between when facilities are started and when they are capable of mass production. It typically takes a year to a

⁸ Brookings Papers: Microeconomics 1993 at 249.

1 year and a half for a new facility to become operational. Debugging manufacturing
2 processes on "pilot production" can take another six months to a year...

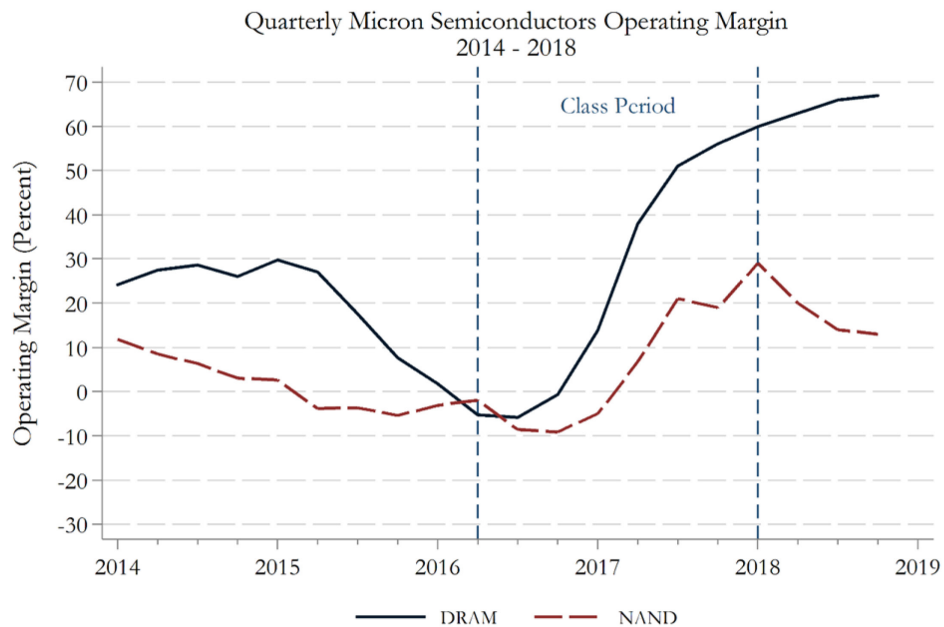
3 Defendants' agreement to keep capacity offline therefore ensured their continued ability to reap
4 monopoly profits even after they relented in restricting supply and recommenced expanding
5 production. In addition, purchasers often source DRAM in connection with requirements for
6 products incorporating DRAM, and given the pressures of supply chain management they often
7 negotiate long-term contracts, another means by which prices can be preserved at a given level for
8 a time after the supply-demand equilibrium has shifted.

9
10 **3. The Extraordinary Margins that Defendants' Obtained Do Not Align**
11 **with Margins that Other Manufacturers Received for Comparable**
Products During the Conspiracy Period

12 207. In addition to the foregoing, another common test or collusion screen utilized by
13 economists to detect the existence of a cartel is to compare the margins the Defendants received
14 during a conspiracy period to a competitive benchmark, which can also provide evidence of supra-
15 competitive profits.

16 208. As the following figures demonstrate, the Defendants' DRAM margins grew
17 substantially as compared to margins obtained on sales of other semiconductor products such as
18 NAND (flash memory chips), CPUs and other semiconductors. These other semiconductors are
19 used in the same applications and share similar production characteristics. Accordingly, because
20 they have common supply and demand factors any substantial differences in their margin behavior
21 may be attributable to the DRAM cartel.

22 209. For example, for Micron, although their DRAM margins were somewhat more
23 volatile in the pre-conspiracy period, their margins in DRAM were, on average, close to NAND
24 margins and were virtually equivalent as of the start of the Class Period (Figure 3).

Figure 3: Truncated Micron Margins (starting 2014)

Source: Micron quarterly financial reports 2014-2018.

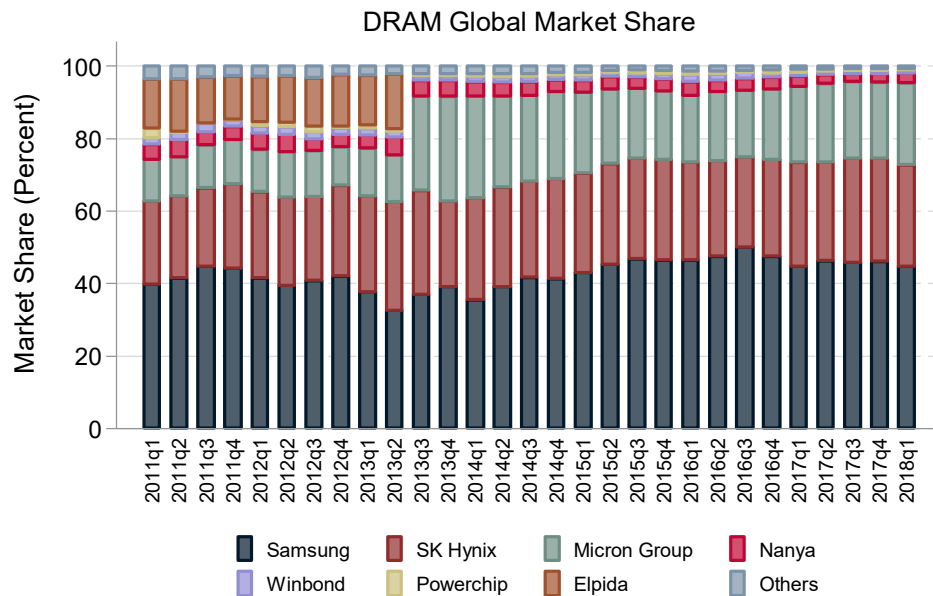
210. During the conspiracy period, however, DRAM margins crossed the line from negative to positive two quarters earlier than NAND margins. Micron's DRAM margins grew close to 60%, while NAND margins hovered around 26%; *i.e.*, DRAM margins double NAND margins, despite the strikingly similar properties of these two forms of computer memory. Indeed, Micron's average margin on DRAM during the conspiracy period was 25.9%, while the average NAND margin was 6.4% during the same period—a 400% difference in magnitude.

211. DRAM and NAND are similar components. Both are memory storage devices and the primary raw materials for both are silicon wafers. They are used in many of the same applications, including in personal computers, servers, and mobile phones. DRAM and NAND are so similar, in fact, that Defendants were able to convert their manufacturing facilities from making one product to making the other.

212. During the conspiracy, DRAM as alleged, had three principal suppliers, the three Defendants here. But NAND had no more than six—the three Defendants here plus Toshiba, Intel, and SanDisk. Six is hardly a multitude in raw numbers, but functionally the six amounted to no more than four because Toshiba and SanDisk were in a NAND joint venture and Intel and Micron were in a NAND joint venture, so the NAND industry structure through the lens of

economic reality rather than corporate formalities amounted to the three DRAM Defendants named here, plus Toshiba. Moreover, the overall combined share of NAND production held by the four major NAND suppliers was even greater than the share of DRAM production held by the three Defendants here. Defendants did dominate the DRAM space, as reflected in their share of the global DRAM market (Figure 4):

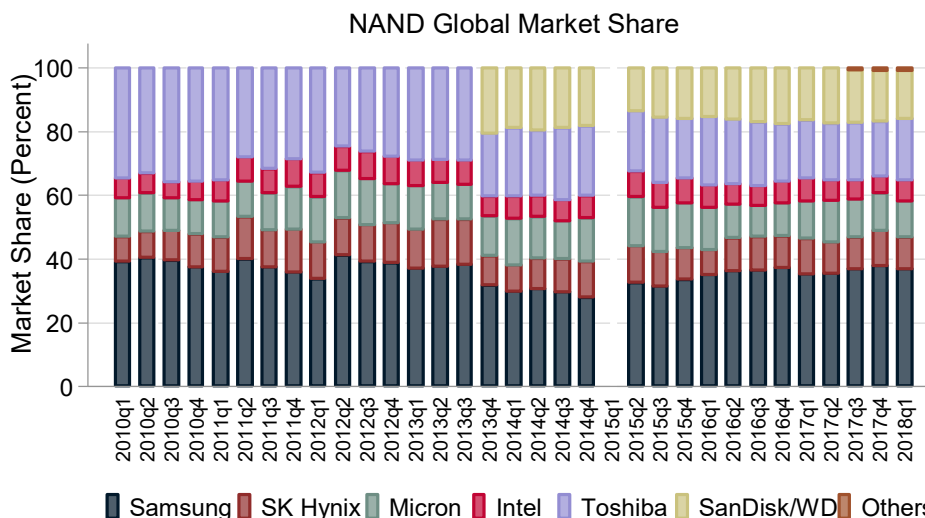
Figure 4: DRAM Global Market Share, 2011-2018



Notes: In 2013, Elpida was acquired by Micron Technology.

Sources: Statista

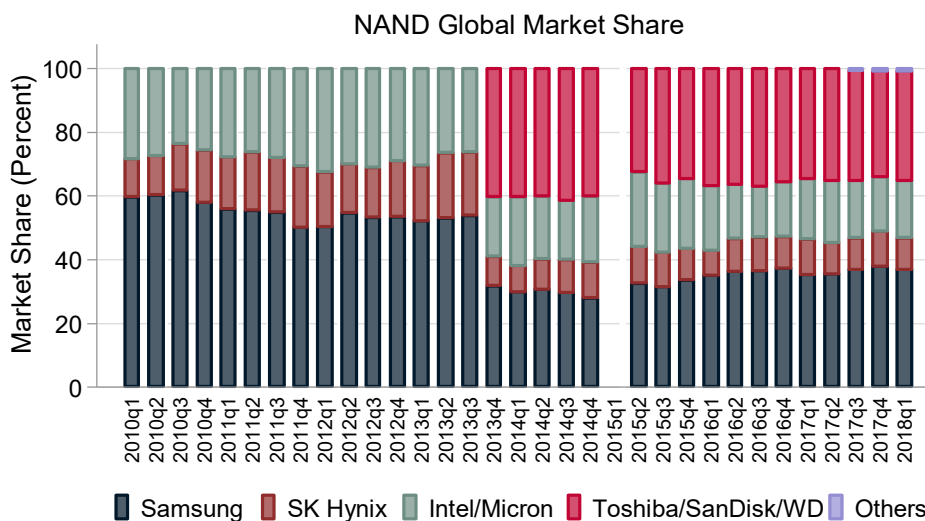
Yet during the Class Period and the years prior the top six NAND makers held an even greater chokehold on that market, as shown in their share of the global NAND market (Figure 5):

Figure 5: NAND Global Market Share, 2010-2018

Notes: (1) In 2000, Toshiba and SanDisk jointly formed a new semiconductor company to produce NAND.
 (2) After Western Digital's purchase of SanDisk in May 2016, Western Digital and Toshiba jointly own NAND flash manufacturing and design facilities.
 (3) From 2005 to 2017, Micron and Intel jointly formed a new company to produce NAND.
 (4) Market share in 2015 Q1 is missing in original data source.

Source: Statista

And the market concentration for the production of NAND was even more pronounced if one treats Micron and Intel, as well as Toshiba and SanDisk, as unified competitors rather than separate businesses, consistent with their joint venture arrangements (Figure 6):

Figure 6: NAND Global Market Share, 2010-2018 (joint venture partners combined)

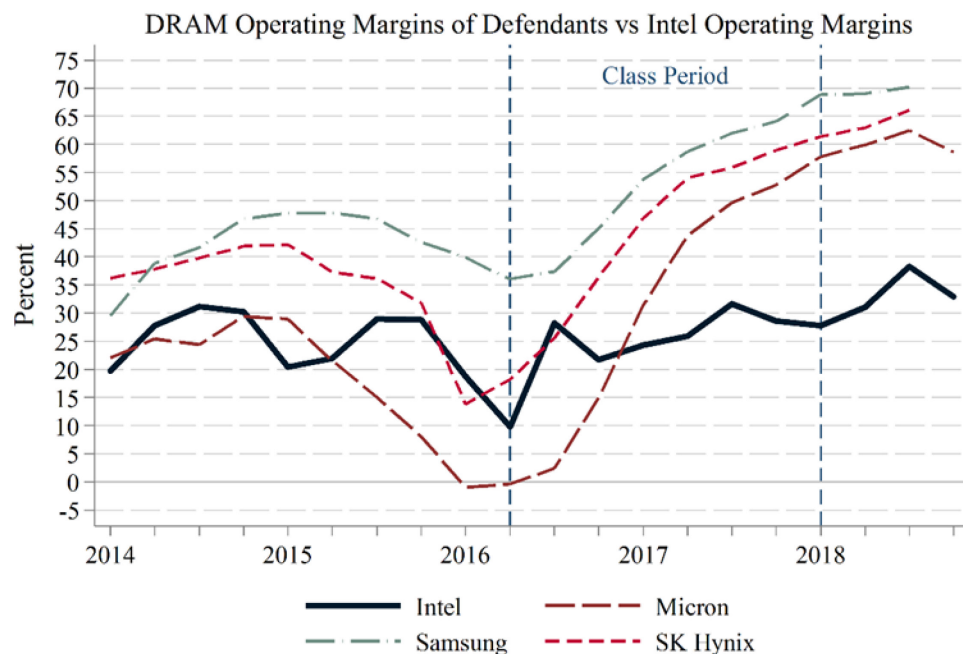
Notes: (1) In 2000, Toshiba and SanDisk jointly formed a new semiconductor company to produce NAND.
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 (3) From 2005 to 2017, Micron and Intel jointly formed a new company to produce NAND.
 (4) Market share in 2015 Q1 is missing in original data source.

Source: Statista

Plaintiffs therefore contend that the distinction between DRAM and NAND that enabled the DRAM suppliers to command four times the margin NAND suppliers commanded was not the existence of three rather than four suppliers, but rather the simple fact that the three DRAM suppliers were engaged in an illegal antitrust cartel conspiracy which did not extend to the fourth NAND company, Toshiba, or to NAND.

210. Similarly, margins for Intel, a major U.S. semiconductor producer, were similar to margins of the DRAM manufacturers (Figure 7) prior to the start of the conspiracy period.

Figure 7: Comparing Operating Margins



211. During the conspiracy period, however, while the Defendants' DRAM margins grew close to 60%-70%, Intel's margins remained at the same levels as the DRAM manufacturers before 2016. The DRAM suppliers' margins also marched steadily upwards, whereas Intel's hovered at 25-30%, consistent with the average NAND margin cited above of 26%, through the 2014-2018 period. Indeed, in the Class Period's first quarter Intel briefly enjoyed higher margins than both Micron and SK Hynix, but by the end all three of Samsung, Micron, and SK Hynix enjoyed inflated margins, propelled by their collusion, that doubled Intel's.

1 212. The foregoing economic evidence is consistent with the existence of a cartel and
2 further bolsters the plausibility of Defendants' collusion.

3
4 **4. The Defendants Acted Against their Own Independent Self-Interest
During the Conspiracy Period**

5 213. The economic evidence also suggests that the Defendants, who collectively control
6 approximately 95% of the market for DRAM, acted against their own independent self-interest by
7 failing (or refusing) to capture additional market share in favor of maintaining the agreed-upon
8 equilibrium of the cartel.

9 214. For example, in 2016, when demand for DRAM was increasing, Samsung restricted
10 DRAM production. Samsung even acknowledged the increase in demand for DRAM in their Q2
11 2016 earnings report, stating that they "expect demand to increase." Despite this increase in
12 demand for DRAM, Samsung cut production.

13 215. Putting Samsung's production cut to the side, had it continued producing DRAM
14 consistent with previous periods, it would have earned higher total profits going forward.
15 Samsung's decision to cut production in 2016, therefore, was not profit maximizing and was
16 against its own independent self-interest, if Samsung had been acting purely on its own initiative
17 and without having obtained assurances from its fellow Defendant co-conspirators that they would
18 adhere to the conspiratorial agreement to restrict output.

19 216. Similarly, after Samsung's production cut, Hynix and Micron ceased expanding
20 production, also despite a rising DRAM demand environment. The economic data show that
21 overall DRAM production levels stagnated even while DRAM prices soared, which indicates that
22 the major producers were not meeting the level of demand in the market, despite the ability to do
23 so.

24 217. Had any of the three major DRAM producers increased production in response to
25 the rising demand, they could have achieved even additional profits and market share.

26 218. That all three of Samsung, Micron, and SK Hynix eventually earned higher profits
27 does not mean they acted consistent with self-interest other than in the most superficial sense.
28 Illegality often pays especially in the short term when uncorrected through regulatory enforcement,

1 but the notion of self-interest within economics literature on competition as opposed to collusion
 2 evaluated competition according to what a rationally acting firm would do if it were competing to
 3 advance its own interests ahead of its competitors' interests and its competitors were doing
 4 likewise.⁹

5 **VIII. VIOLATIONS ALLEGED**

6 219. Plaintiffs incorporate and reallege, as though fully set forth herein, each allegation
 7 set forth in the preceding paragraphs of this complaint.

8 220. Beginning from approximately June 1, 2016—the exact date being unknown to
 9 Plaintiffs—Defendants, by and through their officers, directors, employees, agents, or other
 10 representatives, entered into a continuing contract, combination, or conspiracy to unreasonably
 11 restrain trade and commerce in violation of Section 1 of the Sherman Act, 15 U.S.C. § 1.
 12 Defendants, by their unlawful conspiracy, artificially raised, inflated and maintained the market
 13 price of DRAM as herein alleged.

14 221. The contract, combination, or conspiracy consisted of a continuing agreement,
 15 understanding, and concert of action among Defendants and their co-conspirators, the substantial
 16 terms of which were to fix, raise, maintain, and stabilize the prices of, and/or allocate the market
 17 for, DRAM they sold in the United States, a purpose they advanced through adjacent and
 18 subsidiary subagreements and understandings by and among their officers and other personnel to
 19 restrict output, maintain market share, and fix, raise, maintain and stabilize prices for DRAM.

20 222. For the purpose of formulating and effectuating their contract, combination or
 21 conspiracy, Defendants and their co-conspirators did those things they contracted, combined or
 22 conspired to do, including:

- 23 a. Participating in meetings and conversations to discuss the prices of and/or
 24 supply for DRAM;

25
 26
 27 ⁹ Indeed, if any action that generated short-term profits were deemed self-interested and
 28 consequently permissible under antitrust law, any anticompetitive scheme would be beyond the
 reach of antitrust law provided the conspirators at least for a time succeeded in their collusive
 aims.

- b. Agreeing to manipulate prices and supply to boost DRAM sales in a manner that deprived direct purchasers of free and open competition;
- c. Coordinating the restriction of DRAM capacity in the market;
- d. Sharing information to confirm compliance with their collusive scheme; and
- e. Selling DRAM to customers in the United States at non-competitive prices.

223. As a direct result of the unlawful conduct of Defendants and their co-conspirators in furtherance of their continuing contract, combination or conspiracy, Plaintiffs and other members of the class have been injured in their business and property in that they have paid more for DRAM than they would have paid in the absence of Defendants' price-fixing.

IX. EFFECTS

224. The above combination and conspiracy have had the following effects, among others:

- a. Price competition in the sale of DRAM by Defendants and their co-conspirators has been restrained, suppressed, and eliminated throughout the United States;
- b. Prices for DRAM sold by Defendants have been raised, fixed, maintained, and stabilized at artificially high and noncompetitive levels through the United States; and
- c. Direct purchasers of DRAM from Defendants have been deprived of the benefit of free and open competition in the purchase of DRAM.

225. As a direct and proximate result of the unlawful conduct of Defendants, Plaintiffs and other members of the class have been injured in their business and property in that they paid more for DRAM than they otherwise would have paid in the absence of the unlawful conduct of Defendants.

X. DAMAGES

226. During the Class Period, Plaintiffs and other members of the class purchased DRAM directly from Defendants, or their subsidiaries, agents, and/or affiliates, and, by reason of the antitrust violations alleged herein, paid more for such products than they would have paid in

1 the absence of such antitrust violations. As a result, Plaintiffs and the other members of the class
2 have sustained damages to their business and property in an amount to be determined at trial.

3 **XI. PRAYER FOR RELIEF**

4 WHEREFORE, Plaintiffs seek judgment against Defendants as follows:

5 1. That the Court determine that this action may be maintained as a class action under
6 Federal Rules of Civil Procedure 23(b)(3), that Plaintiffs be certified as class representative, and
7 Plaintiffs' counsel be appointed as counsel for the class;

8 2. That the unlawful contract, combination or conspiracy alleged be adjudged and
9 decreed to be an unreasonable restraint of trade or commerce in violation of Section 1 of the
10 Sherman Act;

11 3. That Plaintiffs and the class recover damages, as provided by law, determined to
12 have been sustained as to each of them, in an amount to be trebled in accordance with the antitrust
13 laws, and that judgment be entered against Defendants on behalf of Plaintiffs and the class;

14 4. That Plaintiffs and the class recover their costs of suit, including reasonable
15 attorneys' fees, as provided by law;

16 5. That Defendants, their subsidiaries, affiliates, successors, transferees, assignees and
17 the respective officers, directors, partners, agents, and employees thereof and all other persons
18 acting or claiming to act on their behalf be permanently enjoined and restrained from continuing
19 and maintaining the combination, conspiracy, or agreement alleged herein;

20 6. That Plaintiffs and the class be awarded pre-judgment and post-judgment interest,
21 and that such interest be awarded at the highest legal rate from and after the date of service of the
22 initial complaint in this action; and

23 7. For such other and further relief as is just under the circumstances.
24
25
26
27
28

XII. DEMAND FOR JURY TRIAL

Pursuant to Federal Rule of Civil Procedure 38(b), Plaintiffs demand a trial by jury of all the claims asserted in this complaint that are so triable.

Dated: October 21, 2019

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ATTESTATION

I, Adam J. Zapala hereby attest, pursuant to Civil Local Rule 5-1(i)(3), that concurrence in the filing of this document has been obtained from all signatories.

/s/ Adam J. Zapala
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